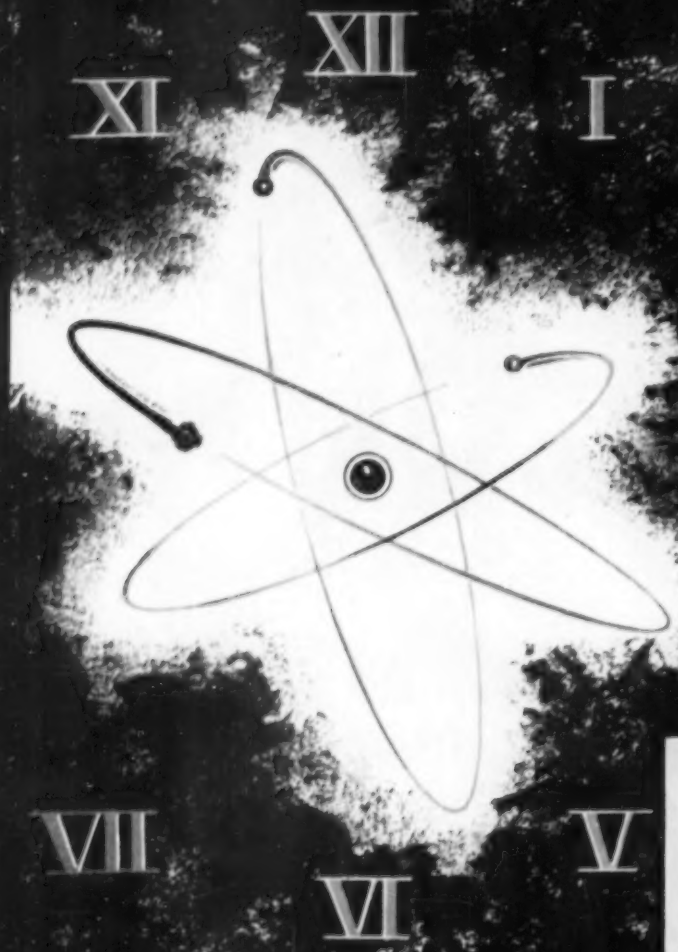
December, 1956

Vol. 45
No. 10

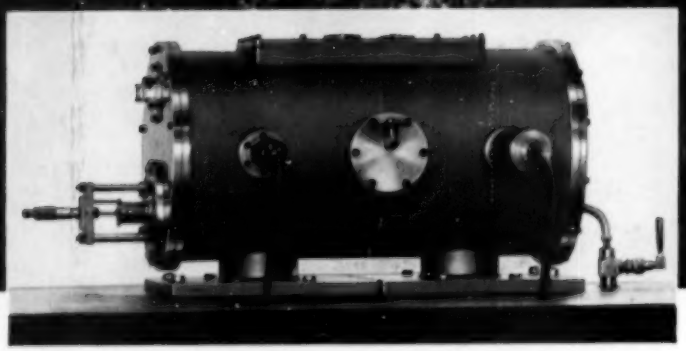
Industrial Arts and Vocational Education

Pre-Convention Number

The Shop Teachers' Professional Magazine



Why an Atomic Clock?



Photograph Courtesy of Jet Propulsion Laboratory, California Institute of Technology.

Scientists at Columbia University have developed an atomic clock. This clock, known as the "maser" (short for Microwave Amplifier by Stimulated Emission of Radiation), produces a 24,000,000,000 cycles per second signal directly from the molecular energy of the ammonia molecule. The maser will be an invaluable tool in the hands of research engineers and scientists who are exploring such fields as radio communications, microwave transmission and reception, and molecular and atomic structure. The atomic clock is another means of furthering man's quest for knowledge of his universe and of life itself.

The modern educator in many ways works like the scientist. Constantly searching for new techniques, new tools, new "masers" to assist him in the education of our future generations. Instructors of mechanical drafting look upon precision drawing instruments much in the same light as the scientist accepts the maser. Certainly a cheaper set could be used by the student to execute his elementary drafting problems, but the completed problem is not the significant lesson of mechanical drafting. Precision drawing instruments foster a boy's first love for precision workmanship. Precision drawing instruments inspire creative thinking and generate a pride of self-accomplishment. Worthy instructors recognize drawing instruments in their true perspective and insist their students obtain the finest set they can afford.

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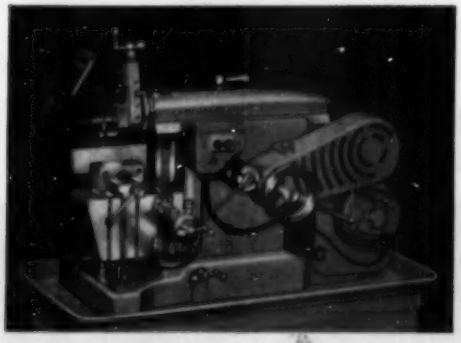

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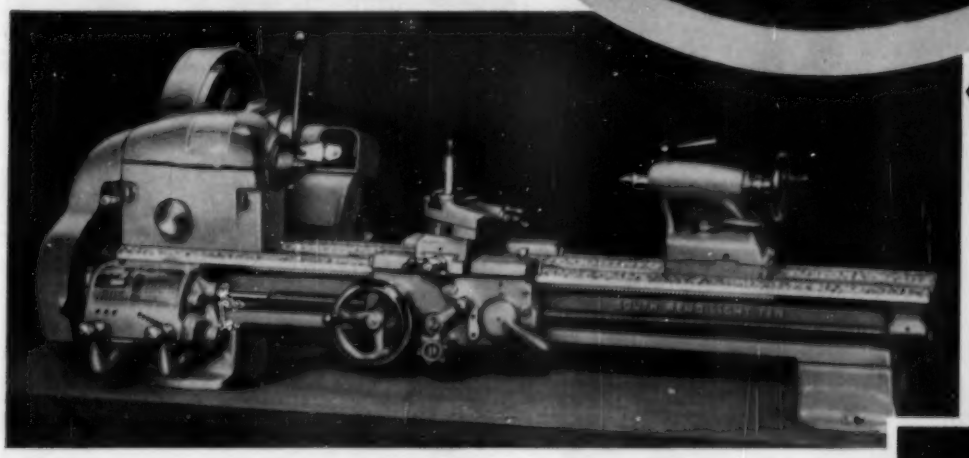

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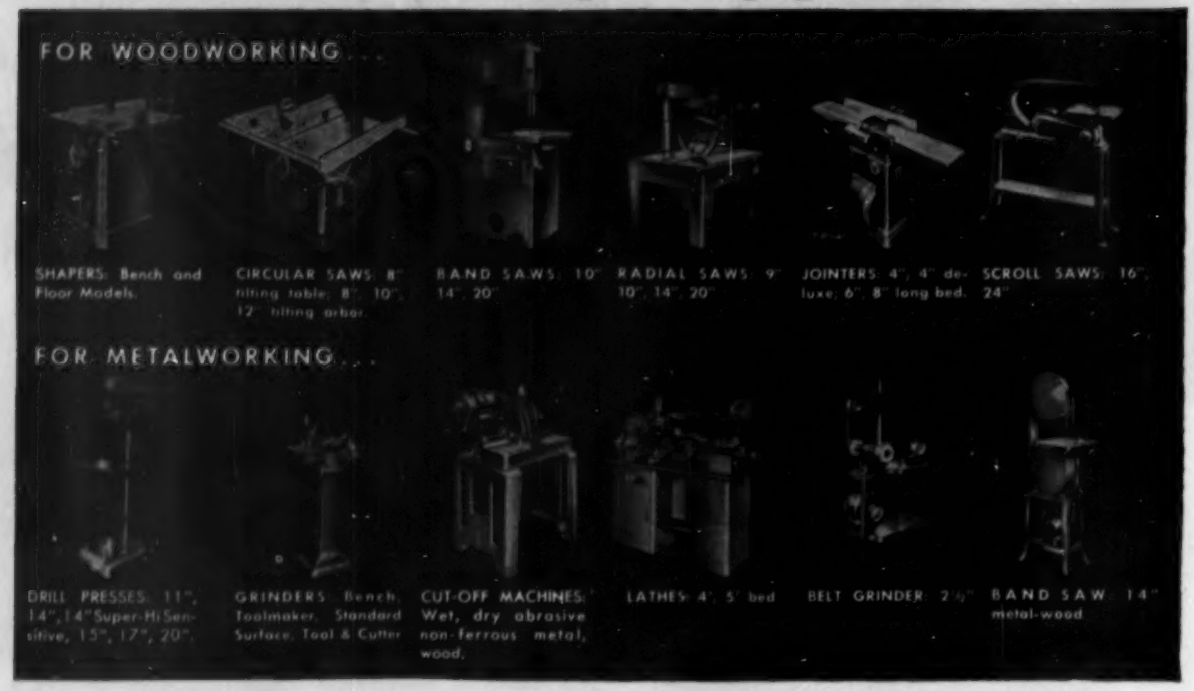
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DECEMBER
1956

VOL. 45 NO. 10

Industrial Arts and Vocational Education

The Shop Teachers' Professional Magazine

Published on the 15th of the month preceding the date of issue by THE BRUCE PUBLISHING CO., 400 North Broadway Milwaukee 1, Wis. • CENTRAL OFFICE: 20 North Wacker Drive, Chicago 6, Ill. • EASTERN OFFICE: 233 Broadway, New York 7, N. Y.

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This Month's Cover

The cover picture on this issue shows Ed Weber and Dwayne Garrett, students in the Vocational Auto Mechanics course at Tucson Senior High School. Their instructor is Robert Ortiz.

Photograph is by advanced photography student Henry L. Ortiz. It was submitted by his instructor, Harry A. Goldstein, APSA, and an instructor of advanced photography at Tucson High School, Tucson, Ariz.

☆ ☆ ☆

The 1956 Index

Subscribers interested in receiving the Index for Volume 45 of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION, of which this present issue is the last number, are urged to write to our circulation department. As soon as the Index is off the press, a free copy will be sent to you.

☆ ☆ ☆

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Subscription Information.—Subscription price in the United States, U.S. possessions, and Canada, $3.75 a year, payable in advance. In all foreign countries, $4.25. Single copies 50 cents. March School Shop Annual, $1.00.

Discontinuance.—Notice of discontinuance of subscription must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration. Notices of changes of address should invariably include the old as well as the new address. Complaints of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions.—The Editor invites contributions bearing upon Industrial Arts, Vocational Education, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for upon publication. In all cases manuscripts should be accompanied by full return postage.

Articles Indexed.—The articles contained in the Magazine are regularly indexed in "The Readers' Guide to Periodical Literature," and "Education Index."

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Association News

COMING CONVENTIONS

Dec. 3–7. American Vocational Association, at Kiel Auditorium, St. Louis, Mo. Secretary, M. D. Mobley, 1010 Vermont Ave. N.W., Washington 5, D. C.

Dec. 6–8. Ohio Education Association, at Sheraton Gibson Hotel, Cincinnati, Ohio. Secretary, Walton B. Bliss, 213 East Broad St., Columbus, Ohio.

Dec. 27–29. Illinois Education Association, at Hotel Sherman, Chicago, Ill. Secretary, Irving F. Pearson, 100 East Edwards, Springfield, Ill.

Dec. 27–29. Pennsylvania State Education Association, at Penn-Harris Hotel, Harrisburg, Pa. Secretary, Dr. H. E. Gayman, 400 North Third St., Harrisburg, Pa.

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WESTCHESTER INDUSTRIAL ARTS MEETING

The Westchester Industrial Arts and Vocational Education Association conducted its first fall meeting in the Albert Leonard Junior High School, New Rochelle, N. Y., on September 26, 1956.

The program for the evening was presented by Mr. Karl of Karl Spin Shop, Oil City, Pa. Mr. Karl, a former industrial-arts teacher, demonstrated methods of metal spinning.

During the business meeting the following officers were installed for the coming year: president, David Wray, New Rochelle; vice-president, William Ploeser, Hastings-on-Hudson; secretary, Richard Froese, Hastings; treasurer, Leonard Banach, Mt. Vernon.

Door prizes, donated by Paterson Bros., and the Brodhead-Garrett Company, were awarded at the close of the meeting. — *William Ploeser, vice-president.*

CENTRAL CONNECTICUT INDUSTRIAL ARTS ASSOCIATION

The first meeting of the Central Connecticut Industrial Arts Association for the 1956–57 season was held in Litchfield, Conn., on October 3. Over fifty members toured the new High School, the first school of its type to be designed and executed by the internationally famous architect, Marcel Breuer.

Following this tour the group continued to the nearby new Wamogo Regional High School for a dinner, a trip through the building, and a short business meeting.

Following the business meeting, Wesley Ketcham, consultant for industrial arts of the State Department of Education, presented a talk titled "Is Your Shop a Safe Place to Work."

Available for the first time to most members was the new school shop safety check list. The list represents an exhaustive study by a state-wide committee of industrial-arts instructors. It provides a basic list with which various groups may work in improving conditions of school shops for safe operations.

The tentative program for the remaining meetings of the school year is as follows:

December 5, 1956 — A workshop at the Teachers College of Connecticut. Members will have an opportunity to try out as well as witness processes in school shop units that may be new to them.

February 6, 1957 — An industrial visitation to a large basic industry (name and details to be announced later).

May 8, 1957 — A meeting at the King Philip School in West Hartford, devoted to displaying school shop kinks, jigs, and teaching aids.

The officers elected last May are: president, Harry Arnini, West Hartford; vice-president, Kenneth Walker, Bristol; treasurer, James Eisenhaure, Litchfield; and secretary, Russell Anderson, Torrington. — *Russell H. Anderson.*

WEST VIRGINIA INDUSTRIAL ARTS ASSOCIATION

The West Virginia Industrial Arts Association held its annual conference on the campus of West Virginia University, Morgantown, W. Va., on October 5 and 6.

The theme of the conference was "Growth Through Industrial Arts and Design."

The program chairman was Andrew K. Ault, instructor of industrial arts, University High School, College of Education West Virginia University.

The first meeting was a breeze session and reception on Friday evening. The second session included a general meeting with President Kolitsch presiding. Following a business meet-

(Continued on page 8A)

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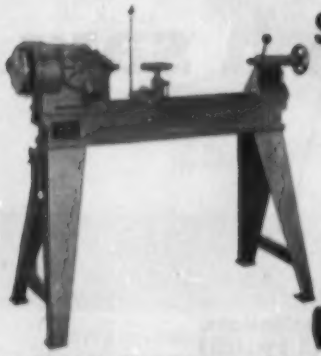

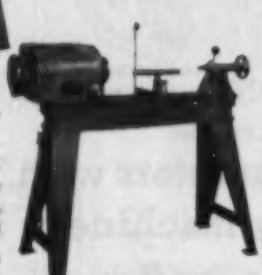

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ASSOCIATION NEWS

(Continued from page 4A)

ing, a talk was given by Sam Madia on "Industrial Arts Design." This was followed by shop demonstrations in plastics, electricity, silk screen work, metal enameling, ceramic painting, electric welding, bookbinding, and metal spinning.

The third session was a luncheon meeting, presided over by Cy Johnson, head, industrial-arts department, Fairmont State College. The principal speaker at this event was Philip A. Reif, superintendent of maintenance, Olin-Mathieson Corporation, Morgantown. A discussion followed which was led by Fred Eberle, state supervisor of trade and industrial education.

OKLAHOMA INDUSTRIAL ARTS ASSOCIATION MEETING

The Oklahoma Industrial Arts Association conducted its annual convention on October 25 and 26, 1956, at Stillwater, Okla.

The program for the two days included a State Advisory Committee Meeting for Industrial Arts in Oklahoma Schools, with Robert A. Hardin, Norman, as chairman; sectional meetings at the Oklahoma City University Industrial Arts Building, which included discourses on leathercraft, electricity, woodwork, printing, drawing, general metal, photography, and plastics; in addition to visits to commercial exhibits.

The tenth annual banquet was held at the Green Room, Oklahoma City University Cafeteria on Thursday at 6:00 p.m.

Dr. Verne Pickens, chairman, division of practical arts, Kansas City, Mo., addressed the group on the subject "Skill is Not Enough."

The Iota Lambda Sigma breakfast was held on Friday morning.

On Friday at 10:30 a.m., the Oklahoma Vocational Association held its general meeting, and the principal address was given by Dr. Kenneth McFarland, educational consultant for General Motors.

The noonday luncheon on Friday was followed by the Industrial Education General Meeting at the auditorium of the Oklahoma City University at 2:00 p.m. Dr. Kenneth McFarland addressed the group.

The "Ship" program was held at 3:30 p.m. Friday, at the automobile mechanics shop of the Industrial Arts Building.

The officers of the Oklahoma Industrial Arts Association are: president, Robert K. Phelps, Carnegie; vice-pres., Denton Floyd, Ada; secy.-treas., C. L. Hill, Stillwater; and directors are Charles Lemons, Tahlequah, Uville Ogle, Oklahoma City, and C. R. Moon, Midwest City.

NEW OFFICERS ELECTED

At the spring meeting of the Northeastern Ohio Industrial Arts Association, the following officers were elected: president, Peter Gulgin, Youngstown, Ohio; vice-president, Ray Steifel, Cleveland; secretary, Paul Clevenger, Parma; and treasurer, Jack Moore, Willowick, Ohio.

Representatives elected at the spring meeting held at the Warren G. Harding High School are: state representative, Edward L. Gattis, Rootstown; city representative, W. K. Dunton, Warren; county representative, Robert Ewing, Solon; exempted village representative, Oren T. Casey, Mentor; delegate at large, Don Kemmanan, Rocky River, Ohio.

The Northeastern Ohio Industrial Arts Association had its Fall meeting in Cleveland, on November 2, 1956.

The group was led by Peter Gulgin, Boardman High School.

The speaker for this occasion was Robert C. Hienton, vice-president of marketing, Cleveland Electrical Illuminating Company, and his subject was "A New Industrial Frontier Brought by the St. Lawrence Seaway." — *Eli E. Steigner, Chairman of Publicity.*

OREGON INDUSTRIAL ARTS ASSOCIATION

The Oregon Industrial Arts Association held its second annual Industrial Arts Fall Conference on November 9 and 10, 1956, at Portland, Ore., with headquarters at Benson High School.

The program on Friday included registration, a tour of the Benson High School, and a banquet followed by dancing in the evening.

On Saturday morning there was a breakfast for Epsilon Pi Tau members, and a short business meeting, followed by "swap talk" among members attending.

There were commercial exhibits and demonstrations, school demonstrations of projects, door prizes by commercial displayers, panel discussions, and previews of films.

On Saturday noon a luncheon was held.

The state officers of the Oregon Industrial Arts Association are as follows: president, John Turbyne; vice-president, Al Riendeau; secretary-treasurer, David Turnbull.

SAFETY EDUCATION PROGRAM AT AVA CONVENTION

A special safety education session has been scheduled for Thursday afternoon, December 6, during the American Vocational Association convention at St. Louis, Mo.

The program includes five special presentations of the do-it-yourself programs and discussions in various areas.

John E. TePoorten, co-ordinator, Wisconsin Schools of Vocational and Adult Education, Madison, Wis., is chairman of the AVA-NSC Joint Safety Committee. The following program is to be presented: "What is the School's

(Continued on page 20A)

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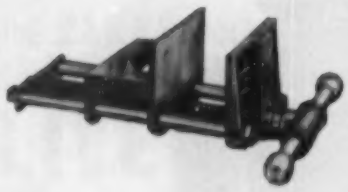

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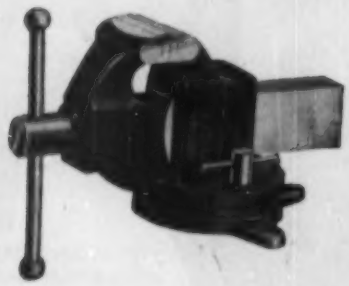

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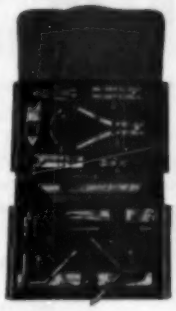
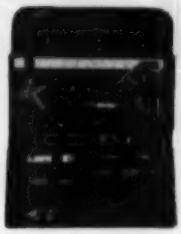
SET OF TOOLS NO. 900
Eight basic tools in a black leatherette case: 6" combination square with center head; 6" rule with pocket case and clip; center punch; center gage; 4" inside, outside and hermaphrodite calipers; 4" dividers.



SET OF TOOLS NO. 901
Similar to Set No. 900 except tools are furnished in strong, attractively finished wood case plus a copy of "The Starrett Book for Student Machinists."

SETS OF TOOLS NO. 902 SERIES
More complete sets in durable, folding, artificial leather cases. No. 902A has 9" square; No. 902B 12" square plus 1" micrometer, center gage, center punch, 6" rule, 4" inside and outside calipers, dividers and hermaphrodite calipers.



NO. 22C 59 DEGREE DRILL POINT GAGE
Measures drill lip lengths and insures correct 59° point angles for best cutting. Also serves as plain rule, hook rule, depth gage, try square and slide caliper.

"SATIN CHROME" STEEL RULES
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NEW HIGH SPEED WELDED EDGE HOLE SAWS
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NO. 153 HACKSAW FRAME
Adjustable for 8, 10 or 12-inch blades. Sturdy satin finish frame with tough rubber pistol grip. An ideal frame for use with Starrett hand hacksaw blades.

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No. 124A Inside Micrometer
No. 11 Combination Square, 12 inch
No. 1010 Dial Indicator Pocket Gage
No. 815 Toolmakers' Hammer
No. 86A Combination Hand Vise
No. 596 Pencil Divider
No. 54 Hold Downs
No. 196A Universal Dial Test Indicator
No. 29 Scratch Gage
No. 56A Toolmakers' Surface Gage
No. 172A Thickness Gage
No. 70A Pocket Scribers
No. 500 Steel Pocket Tape, 72 inch
No. 530 Steel Case Tape
No. 711F "Last Word" Dial Test Indicator
No. 50A Improved Trammels
No. 93A T-Handle Tap Wrench
No. 132 Bench Level, six inch
No. 129 Bench Block
No. 236H Depth and Angle Gage
No. 135 Pocket Level
No. 165 Double End Pin Vises
No. 166 Pin Vises
No. 579 Telescoping Gages
No. 185 Tap and Drill Gage
No. 187 Jobbers' Drill Gage
No. 167 Radius Gages
No. 829 Small Hole Gages
No. 555 Jewelers' Screw Drivers
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For example, No. 7CDW specifies 4 x 7" jaws, 9" opening, solid nut mechanism, dog type front jaw, seasoned hardwood handle—old catalog No. 5CD.

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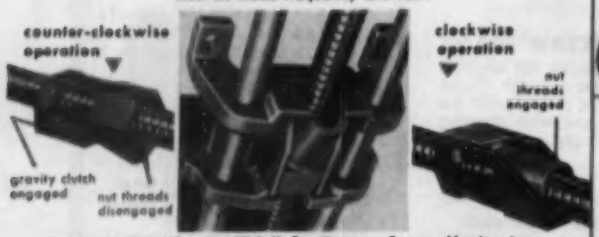
tubular steel handle optional no extra cost
adjustable steel handle on 2 models

Illustration shows either 7CDW or 7RDW vise depending on type of continuous screw mechanism employed.

RAPID ACTING CONTINUOUS SCREW VISES

. . . for use where changes in jaw openings must be made frequently and fast!



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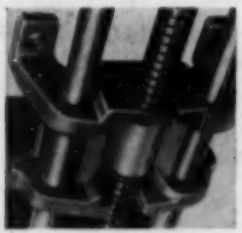

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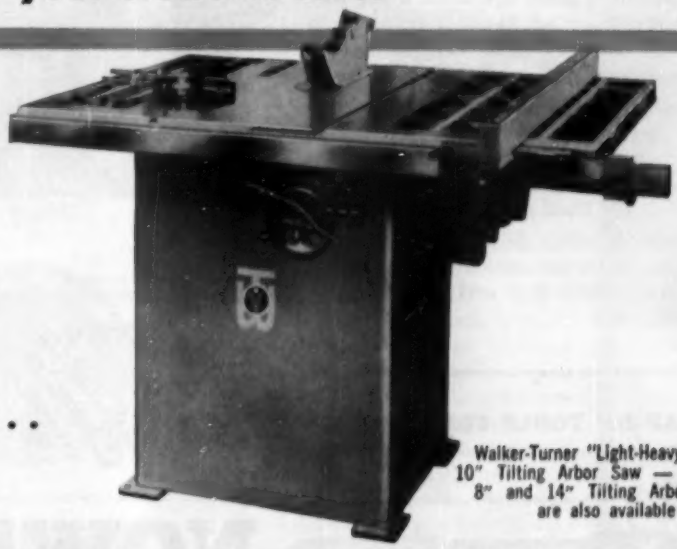

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Industrial Arts and Vocational Education
The Shop Teachers' Professional Magazine
DECEMBER 1956

A Fine Convention City —

St. Louis to be Host to the 1956 AVA Convention

J. ERNEST KUEHNER
Director of Administration, in Charge of Technical, Industrial, and Adult Education
St. Louis, Mo.

Once again St. Louis will be host to the American Vocational Association when it convenes in December. The convention will begin on December 3 and carry on through December 7.

St. Louis is happy to welcome the conventioneers this year — happy because of the opening of a new technical high school on September 4. This new school, the John O'Fallon Technical High School, was started about two years ago and was completed in time for the opening of the school year. To be sure, some of the equipment has not been received and installed; pupils are stepping over a few wires and around a few workmen, but the school is in operation.

Technical education in St. Louis dates back to August 3, 1854. When the Articles for Washington University were drawn, the directors insisted that an "Industrial Department to be known as the O'Fallon Industrial School shall be included." The Industrial School was to "be established whenever an actual endowment of $10,000 shall have been secured; in addition to the two blocks of land demanded by Colonel John O'Fallon for this purpose."

Thus was the beginning of St. Louis' first vocational school. This movement gained national recognition when Congress passed the Land Grant Act in 1862. This act enabled the Federal Government to provide public lands upon which the various states were to estab-

The ninth grade general shop; at right, the mill room in the woodworking department

lish colleges of agriculture and mechanical arts. During the passing years the O'Fallon Institute served and grew. By 1868 Washington University had erected a new building for the Institute at a cost of $500,000. This high cost brought on problems that indicated the educational purposes of the institute might be slighted. So the trustees of Washington University offered to sell the new building and to give the legacy of $100,000, bequeathed by Henry Ames (for whom the new Ames School is named), to the St. Louis Board of Public Schools for the total price of $280,000. This special price included an agreement in writing that the Board should provide "technical and technological instruction for those preparing for mechanical or other pursuits."

The Board agreed, bought and assumed its new obligation. Since most of the students worked during the day, evening school classes were scheduled, the first term opening on October 29, 1868. Calvin M. Woodward was the first principal. He later became known as the "father of manual training" because of his work in establishing the St. Louis Manual Training School in 1879. Doctor Woodward had become associated with Washington University and with its co-operation he was able to start the manual training school. However, his work as principal of the O'Fallon Polytechnic Institute was restrained by a lack of understanding from his superiors.

By the year of 1890, the St. Louis board of education thought well enough of Dr. Woodward's manual training school to authorize an experimental manual training class at the L'Ouverture Elementary School. It was only a short time before this kind of education was recognized as worthwhile and grade school classes in sewing, printing, shorthand, and shoemaking were made available to the children of the citizens of St. Louis. Several years later, in 1892, the first business courses for high school pupils were introduced by Central High School. The two courses offered were bookkeeping and shorthand. In 1904, the McKinley and Yeatman High Schools began to offer manual training and domestic science courses to high school pupils of St. Louis.

Highly significant to vocational education — not only in St. Louis, but on a national scale — was the establishment in 1907 of the David Ranken, Jr., School of Mechanical Trades. The following exerpts from the will of David Ranken, Jr. best express his philosophy on vocational education: "Whereas, for many years I have been impressed with the fact that too little attention is given to the instruction of boys in the mechanical trades, I am satisfied that there is need of an institution the object of which shall be education and instruction in the ordinary mechanical trades and in which boys, especially, may be taught the dignity of labor. . . . I have, therefore, formed an intention of endowing an institution in the city of St. Louis and the State of Missouri, in which boys and men may be trained to habits of industry and economy. . . ." This privately endowed school has become one of the leading schools of the nation.

Another important step in St. Louis' vocational program came indirectly in 1917. Two men who lived in the East, Dr. Charles A. Prosser (for whom the new technical school in Chicago is to be named), a lawyer and school teacher, and Dr. Charles R. Allen, a teacher of chemistry, worked together to promote vocational education for the nation. Their success came with the passage of the Smith-Hughes Act of 1917. This act provided federal funds for state departments of education, which in turn were to use the money for vocational education in the schools of their states. With this encouragement, St. Louis made plans for the future.

The next step occurred when classes for boys and girls, who left school at an early age in order to work, were organized. These classes were called "continuation" classes and began in 1919. Four years later, in 1923, the Jefferson Vocational School was formed by combining the various trade and commercial classes of the school system. After three years of operation the Jefferson School was changed to an intermediate school and was renamed the Franklin School.

Later, in the year of 1926, the board authorized Thomas E. Spencer to organize a new vocational school. It was on December 14 of that year that the board created provisionally "the Vocational School" based on the following recommendation of the Superintendent: "Since the intermediate and high school as now organized and conducted do not meet the educational needs of those who must seek early employment, therefore, a new school of a vocational type should be constituted." The following month the first groups were organized and the classes met in rooms at the Yeatman and Roosevelt High Schools. The total enrollment reached 44.

In September of 1927, the vocational classes were moved to the Central High School building, but here, after less than a month, the tornado scattered the classes again. The Central Building was restored and soon had a student body of around 2000 pupils, being the combined classes of the Franklin Intermediate and the Vocational School. On May 14, 1929, the school was renamed the Herbert S. Hadley Vocational School. In September of 1929, the board organized the second vocational school in the city for the purpose of serving the Negro pupils and gave it added dignity by naming it after one of the greatest men the world has known — Booker T. Washington.

During this time the board had been

Entrance to O'Fallon Technical High School, St. Louis, Mo.

The electric shop, electric machinery, wiring, and motor repair; at right, electronics – radio and television repair

busy visiting cities, inquiring about successful vocational programs, and gaining information with which to build a new vocational school. The Hadley Building was planned to annex the part of Central High School that was not destroyed by the tornado and the cornerstone was laid on November 29, 1930. On February 14, 1932, the Hadley Building was dedicated. The public toured the five-story school and the new tearoom served its first dinner to board members, officers, and principals. In September, 1940, the name was changed to the Herbert S. Hadley Technical High School.

During the summer of 1956 the Washington Technical High School was transferred to the Hadley building. Since the schools of St. Louis are now integrated, it was felt that the two schools should not be identically equipped. For example, Aero Mechanics will be taught only in the O'Fallon School, while shoe repair is taught only in Hadley; beginning machine shop classes are taught in both schools while advanced machine shop and tool and diemaking are taught only in O'Fallon. In order to relieve some of the high schools east of Grand Avenue there are some 400 students from the regular academic high school districts in the Hadley building, thus making it a comprehensive high school rather than a district technical school. Booker T. Washington is now the name of one of the newer elementary schools.

The primary function of technical education in St. Louis is to provide educational experiences for those pupils who desire training for the purpose of obtaining immediate, useful, and gainful employment. College entrance requirements may also be fulfilled if the pupil expresses such a desire a year or more before his date of graduation. Pupils are admitted upon graduation from the eighth grade.

A. Requirements for Graduation

I. General Requirements
1. A minimum of 36 term credits (18 units).
2. Included in the total are:
   a) 6 term credits (3 units) of English;
   b) 6 term credits (3 units) of Social Studies of which 2 credits (1 unit) must be U. S. History;
   c) 2 term credits (1 unit) of Science;
   d) 2 term credits (1 unit) of Mathematics;
   e) 16 term credits (8 units) of vocational work. This includes skill subjects of the specific courses together with related information subjects of the upper terms.
   f) 4 term credits (2 units) of free electives, either vocational or academic.

II. Application of the Above Requirements
1. The maximum credit that can be allowed for the ninth grade is 9 semester credits (4½ units).
2. The minimum program carried by any pupil in this school above the ninth grade should be 4½ credits per semester. Pupils in terms 7 and 8 should understand that they must carry a full program of studies, that such a program constitutes a contract and that all subjects assigned must be passed with a satisfactory grade, regardless of the total count of credits shown on the record card. Recommendation for a shortened program for any pupil in the seventh and eighth term by a program chairman must be approved by the principal in advance and noted on the pupil record card. Work experience (4 hours a day) in a job related to the pupil's major field may be substituted for the major assignment (20 periods per week) in term 8 with equivalent credit.
3. The maximum program above the ninth grade is limited to 5¼ term credits.
4. Pupils coming to the O'Fallon after 4 or more terms in a comprehensive high school may require one or more terms beyond the four years of secondary school education in order to graduate. In any event, a pupil must complete 4 terms in a major vocational course.

III. Counseling Pupils Toward Graduation
1. This counseling begins not later than the first term of the eleventh grade. Program chairmen and teachers on their committees see to it that each pupil knows whether he can earn sufficient credits to graduate in two years.
2. After the end of the first term of the 11th grade, the program chairmen and teachers will advise pupils on taking a special course leading to immediate employment rather than working toward graduation, if the factors involved justify such advice.

Certificate of Attainment:

A pupil whose record in vocational subjects is satisfactory may obtain a certificate of his attainment for employment without meeting the formal requirements for a diploma. Assignment of a special program for one term or more to a pupil who has passed his

seventeenth birthday may qualify him for such a certificate.

Co-operative Employment of Vocational Pupils:

Many pupils will have the opportunity in Grade XII–2 to be placed on co-operative jobs. Co-operative employment means that an employer assumes responsibility for providing learning experiences which are valuable to the pupil in his or her chosen occupation. A co-op job replaces an equal quantity of school shop work. If for any reason the pupil does not have a co-op job, he or she devotes the allotted time to learning experiences in the school shops.

Selecting a Vocational Course:

In the shop and related work of the ninth grade industrial and tenth grade commercial, pupils have the opportunity to explore and discover their interests and abilities; in the social study class, the requirements for success in the various occupations and the opportunities for employment are discussed. Visits are made to O'Fallon's major departments. By means of standardized tests, the pupil's general intelligence, mechanical aptitude, reading ability, arithmetic ability, clerical aptitude, and vocational interests are measured. Upon completion of this exploratory program, aided by the counsel of their teachers and with the signed approval of their parents, pupils should be able to make an intelligent choice of a school program leading to an occupation.

O'Fallon maintains a policy of free choice in the selection of the shop or commercial course to be pursued. This allows the pupil to make a change in a course if such a change would be beneficial in helping him locate himself in the vocation for which he is best fitted.

Tuition:

There is no tuition charge for residents of St. Louis. Tuition for nonresident pupils is approximately $460 per year.

Science:

The nation's resources of skilled workers are strengthened with the acquisition of scientific knowledge. In the Technical High School, industrial pupils enroll in Science related to their major trade. Seniors in the business training division are offered Science on an elective basis.

Formal Mathematics:

It is recognized that mastering specialized mathematical knowledge is necessary for those whose educational plans require it and who are gifted with specialized ability. Definite provision is made in the Technical High School to provide instruction in formal mathematics for this group.

Transfers to the Technical High Schools From the Comprehensive High Schools:

The high school principals approve transfers between the technical and comprehensive high schools. Complete details and application blanks may be obtained by applying to your counselor or assistant principal.

Postgraduate Courses:

To the extent that room is available, high school graduates residing in St. Louis and who have not reached the age of 20, may upon graduation from an accredited high school, register in the postgraduate division at the O'Fallon in vocational, technical, or business training courses.

The business courses provide wide opportunity to prepare for many beginning jobs in the business world. The school provides the maximum opportunity for pupils to develop skill in the use of a variety of modern office machines.

Pupils who do not elect stenographic or secretarial courses, find equally valuable training in general clerical or bookkeeping courses where emphasis is on bookkeeping, miscellaneous machine operation and general office procedure of the modern organization.

High School Co-operative Program:

This is a program developed through co-operation between the comprehensive high schools and the O'Fallon Technical High School. Students are given an opportunity to supplement the general education offerings available in the home high school by enrollment in technical courses at O'Fallon on the specialized equipment not available in the other high schools.

Each *Co-op* student attends the home high school for one half day and attends the O'Fallon for the other half day. He continues to take part in his home school activities and graduates with his class since credits earned at O'Fallon are applied to meet graduation requirements in the home high school. The amount of credit to be granted for the technical training is determined by the principal of the home high school.

Senior Work-School Program:

Seniors in the last term in high school are permitted to work in industry on the half-day basis. They work on jobs that include activities in their major fields and receive school credit for this work experience. These students are working in banks, universities, schools, accounting firms, manufacturing and publishing companies, furniture stores, and decorating companies.

These seniors work in occupations listed under the clerical sales and kindred occupational classifications in the *Dictionary of Occupational Titles*. The pupils are employed as bookkeepers, posting clerks, credit clerks, transcribing machine operators, typists, clerks, stenographers, receptionists, bookkeeping machine operators, billing machine operators, file clerks, comptometer operators, etc.

A second group of students enrolled in the technical schools in St. Louis are those in the adult education program. This program consists of six major divisions. They are: (1) the indentured apprentice program for learners in the skilled building trades; (2) the business training program for office practice skills; (3) Home and Family Education Program, so popular for the newly married housewife; (4) the high school tutorial program for adults; (5) the veteran's training program for Korean veterans; and, (6) the trade and industrial program.

The adult trade and industrial program uses the same facilities used during the day for its evening school classes. Daytime classes have especially equipped facilities. Apprentices spend half the day in class at the expense of the trade union and the employer and the remaining half of the day on the job. In this program we expect to enroll some 10,000 persons during the school year of 1956–57. A faculty of some 125 persons is employed and although many are from the regular day school faculty, a large number of the teachers are from industry. The classes meet two, three, and four hours an evening, with many of them meeting two evenings a week of the term of 15 weeks.

The need for adult education has increased as modern living has become more complex. There was a time when a few simple skills were all that were required by the average man in order for him to earn a living. It was also true that these skills did not change very much, and that a worker could feel secure in his occupation for a lifetime. This is typified in but one of the programs conducted. The electrical industry in St. Louis is sponsoring a training program to improve the skills and knowledge of journeyman electricians. Although many of these skilled craftsmen have been in the trade for years, the men, the employers, and the union realize that the challenge of automation and of technological changes makes it necessary for these men to prepare themselves accordingly.

This is the 98th year of adult education in St. Louis sponsored by the board of education. It all started when the immigrants, or foreign-born, as they were then called, eagerly sought to read and write the American language. These classes are still popular in the evening schools evidenced by the fact that more than 150 persons were taught to read and write in the 1955–56 program.

In the business training program, bookkeeping, bookkeeping machine, comptometry, shorthand, typing, PBX

The machine shop, one of three in the department; at right, the printing department
— Photographs, Earl L. Schmieder, St. Louis, Mo.

operation, filing, and receptionist courses are available.

The home and family education program includes millinery, clothing for the family, advanced tailoring, dress pattern design making for the homemaker, and the popular foods classes.

The tutorial program permits the adult who did not finish high school to work toward a high school diploma. The student enrolls for two subjects at a time and one hour per week per subject is spent with the teacher. Definite assignments are completed at home in each subject. At the conclusion of the required course, an examination is taken over the semester's work. A person works at his own capacity — some complete the courses in 8 to 10 weeks, others take as long as fifteen weeks.

Adult education classes are held in four of the high schools during the fall and winter semesters. A registration fee is charged in accordance with the subject.

In summing up technical education in St. Louis, the following quotation from superintendent of instruction, Philip J. Hickey describes best what is in the future for these schools:

With the completion of the new O'Fallon Technical High School and the transfer of the Washington Technical High School to the Hadley Building, the Board of Education wanted to get rid of the mistaken idea that technical education school students were misfits who gravitated to trade school after failing elsewhere in the educational system. The present aim is to give high quality college preparatory training in engineering as well as good vocational instruction. This will mean that there will have to be some selection of students applying for the eleventh and twelfth grade courses in technical high schools. Those whose records indicate they cannot benefit from more advanced subject matter will not be allowed to take these advanced courses.

When you attend the AVA in St. Louis in December, you are cordially invited to visit these two technical high schools. Especially will you want to visit the O'Fallon Technical High School . . . the newest technical school in America.

Girls Do Good Work Wherever This Has Been Tried —

Industrial Arts For Girls

CECIL ACUFF
Tryon Public Schools
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The development of commerce, transportation, industry, and the salesmanship attendant to this growth has made necessary a more practical education for the future homemakers of America. In no other phase of the school curriculum is there such a variety of subject matter or the facilities and the chance to satisfy the individual needs of our youth. Home economics is making notable progress in this direction, but it cannot cover nearly all the phases necessary to educate the girl for living in present society. Most instruction for girls in industrial arts has been in the realm of home mechanics only. Certainly such training is important, but it is felt that the industrial-arts program has a much broader opportunity and obligation.

Because the United States is no longer an agrarian nation with widely decentralized industries, the village youth of today cannot become acquainted with greatly varied work of the world at the local blacksmith shop. In this age of specialization, most of man's life must be spent preparing for and pursuing a chosen trade, vocation, or profession. Due to the increasing complexity of social organization and

the many club, school, and church functions of the community, man spends little time in his home. Consequently, more and more of the responsibilities of operating and maintaining the home are relegated to the modern housewife.

This change in the American economy that has created a demand for the increasing participation, knowledge, and interest of women in all matters, has changed the scope of the industrial-arts program. Statistics from the United States Bureau of Labor report that each decade more and more women join the labor force; that the young woman of today tends not to stop work upon marriage. In April, 1950, 22.5 per cent of all women married and living with their husbands, were working.

The security and preservation of our country requires not only the willingness of women to serve in positions of responsibility and skill but their training as well. In supplying the free world with munitions and manufactured goods, the productive capacity of the United States must be maintained, and in the event of an emergency, this nation may be forced to use considerably more men for the armed services than in World War II. This would necessitate the entry of a vast number of women into the labor force. The guidance, training, and placement of these women would require precious time. In the absence of men, women would be faced with all the upkeep of the home and of the machines and apparatus therein. Abruptly, they would be confronted with new responsibilities and problems.

The School's Duty

The schools have a marvelous opportunity and the urgent responsibility of providing an education that will enable the girls of today to adjust as well as possible to the eventualities of the future, thereby serving not only the individual but the nation and the world. The industrial-arts program has the occasion to teach girls things concerning the industrial world which will make of them more useful and valuable citizens, regardless of their status in life.

Objectives of Industrial Arts for Girls

The objectives of an industrial-arts course for girls should be, in general, the same as those for boys, with perhaps more emphasis on avocations, home mechanics, and consumer education. The following definition of industrial arts for girls has been proposed by the writer: Industrial arts for girls in the secondary school should include experiences in the care, repair, and maintenance of the home and its devices and appliances, the development of wise avocational and vocational choices, and the preparation for intelligent participation in our consumer and industrial world.

To achieve these aims, the ensuing objectives are suggested:

1. *Guidance.* The girl in the school shop may discover talents and aptitudes which would not have been found otherwise. These may help her to plan her educational future more wisely. The Bureau of Labor reports that almost one out of every three women 14 years of age or over was in the labor force in April, 1950. Before the industrialization of the United States, the women produced goods and performed services for the family group. Then when so many of these services began to be done commercially by agencies outside the family, the housewife had less need to perform household services and more need for money income with which to pay for goods and services. This fact, together with the need of an enlarged industrial world employing more workers, has influenced women to seek jobs in increasingly large numbers. An industrial-arts course in the secondary schools would afford the girl with some evaluation of her abilities and give her some knowledge of the requisites and practices of industry.

In the development of a hobby or leisure-time interests, the high school girl has the opportunity to learn how to spend her spare time both pleasurably and profitably. In the modern world, with its tensions and strains, everyone needs an avocational interest to aid in relaxing and in decelerating the rapid pace; a vent to release nervous energy. The vast number of labor-saving devices has given the modern woman far more leisure time. She needs a way of using this time advantageously. To master a hobby, to create and make things gives one a great sense of accomplishment; a satisfaction of achievement which is so necessary for true happiness.

2. *Consumer Education.* Many industrial products are cheaply constructed and poorly designed. They are made for the mass of people who have little knowledge of construction and design. Heretofore, schools have emphasized teaching the pupil to earn. The spending of money is just as important, and educators should discard the belief that somehow consumers will learn the art of living without any special training. Since the modern housewife is the most influential person in a majority of the purchases connected with her household, and in view of the maze of manufactured products on the market, a knowledge of industrial products would be very beneficial in enabling the housewife or career woman or laborer to make wise and prudent selections.

3. *Knowledge of Home Ownership.* To own and occupy a home of their own is the fondest dream and most fervent desire of many families. Most of these families can have only one home in their lifetime; therefore they should be able to do a great deal of discerning and judicious planning in order that their home will be economical, attractive, and constructed to best serve their particular needs.

4. *Home Mechanics.* The home of today, especially the kitchen, is an array of *gadgets* and labor-saving devices, most of which are mechanical or electrical in nature and require some degree of maintenance and care for their satisfactory and economical use. Due to the specialization of today's worker, men are less likely to be ***handy men***, and as a result, the responsibility of operating the home falls to the housewife. The household which is mechanically deficient permits decay and damage of household equipment and supplies, the usefulness of which could easily be prolonged. Experts are called in to do trivial jobs at mechanic's rates, which the ordinary person skilled in the simple mechanical operations could perform with ease. Sometimes damage is done and loss incurred because the untrained individual is not capable of acting immediately upon the discovery of a defect. It is not proposed that the school train girls to replace skilled plumbers, electricians, and repairmen. It is suggested that the individual be capable of performing simple tasks, and to know when it is advisable to secure the services of an expert. The woman of the house would derive great personal satisfaction and add to the economy of her household by being able to perform simple maintenance tasks.

5. *Knowledge of Furniture.* The average housewife makes most of the selections of furniture for her home with very little information. Courses in home economics that include some instruction in the selection of furniture are concerned mostly with color combinations and arrangement. With no conception of good functional design, no knowledge of proper construction methods and types of woods, the housewife chooses at random, selecting the piece that has the shiniest surface or the most ornamentation or simply the piece that happens to appeal to her untrained taste. Mass-produced furniture often has important constructional weaknesses, poor functional design, nondurable finish, and inferior wood that has been stained to resemble mahogany, walnut, or other more costly woods. An acquaintance with the desirable construction methods, the kinds of wood used, the imitations possible, finishes, and labeling practices would enable the housewife to select attractive and lasting furniture at a much lower over-all cost.

6. *Ability to Use Tools and Machines.* Learning is largely a matter of doing, especially in the manipulative processes. To have experiences in the use of tools and small power machines would familiarize the student with equipment needed to perform many simple household tasks and enable her to become more efficient. The making of small, useful projects in a variety of materials served as a method of teaching tool uses, properties, and utilization of many industrial materials. All this knowledge may be applied later to the creation and improvement of home furnishings and fixtures.

7. *Drawing and Sketching.* The aim of this objective is not to teach the girl to become a draftsman but to enable her to read blueprints intelligently and to make simple dimensioned sketches of industrial products. Students will gain a better sense of proportion and the ability to set impressions on paper and to visualize the appearance of concrete objects. Many things are difficult to describe, especially with the limited vocabulary of the average high school student; but, with practice, the object can be sketched, saying by a drawing what words have failed to express.

8. *Knowledge of Safety Practices.* A large percentage of accidents do not just happen but are caused — usually by the negligence of an individual. Much of this disastrous negligence is the result of a lack of knowledge of safe practices and of the hazards often inherent in seemingly insignificant practices. Many people have unsafe habits and have never been informed of the fact that each time an unsafe act is performed, the well-being of other people is jeopardized by the potential consequences of that unsafe action. The time and place to teach safety principles is in the school. The girl well versed in safety education will be able to operate safely and maintain electrical and mechanical devices, because she can differentiate between the safe and the unsafe. She probably can eliminate many costly, annoying, or distressing incidents in the home.

The Course Outline

Each area of this outline is divided into two parts: *manipulative* and *related subject matter.* The material should be sufficient to cover two semesters of study. The study units are proposed for high school students but could be used as easily for junior high pupils.

I. Woodworking
  1. Manipulative
    a) Learn use of simple woodworking tools
    b) Make simple projects that will enable student to use tools and become acquainted with various woodworking procedures
    c) Finishing and refinishing methods and practices
    d) Repairing furniture
  2. Related Subject Matter
    a) Learn names of tools used
    b) Study of furniture design, furniture periods, and furniture construction
    c) Consumer knowledge of how to buy furniture wisely
    d) Kinds of woods used in furniture, reasons for their use, and sources and procurement of lumber
    e) Advantages and disadvantages of various finishes and finishing methods
    f) Care of furniture
    g) Study of veneers and their use

II. Electrical
  1. Manipulative
    a) Make extension cords, repair damaged cords on appliances
    b) Detect and replace a blown fuse
    c) Wire bells and buzzers
  2. Related Subject Matter
    a) Knowledge of meaning and uses of electrical terms
    b) Brief study of electric motors and their maintenance
    c) Study of conductors and nonconductors

III. Mechanical Drawing
  1. Manipulative
    a) Make simple drawings and sketches
    b) Make simple house plans
  2. Related Subject Matter
    a) Learn to read blueprints
    b) Study of types of houses and purposes of each
    c) Brief study of building codes and their purpose
    d) House planning
    e) Study of building materials and advantages and disadvantages of each

IV. Automobile Mechanics
  1. Related Subject Matter
    a) Knowledge of general maintenance
    b) Study of trouble shooting
    c) Study of fundamental principles of an automobile
    d) Common reasons for car not starting
    e) Methods of washing, cleaning, and polishing

V. Household Mechanics
  1. Manipulative
    a) Repair leaky faucet
    b) Sharpen knives
    c) Clean a drain trap
    d) Replace broken glass in window or door
    e) Upholstering and repair of upholstery
    f) Lubrication and care of most common electrical devices
    g) Care and repair of garden hose
    h) Care and use of files and stones
    i) Heating fuels and plants and methods of control
    j) Methods of ventilation
  2. Related Subject Matter
    a) Study of various plumbing fixtures
    b) Adjustment and cleaning procedures used in household appliances
    c) Consumer knowledge of what to look for in buying all kinds of household devices and appliances

VI. Crafts and Hobbies
  1. Manipulative
    a) Make projects in wood carving
    b) Make small leather projects
    b) Make small leather projects
    d) Make simple projects of art copper
    e) Cut out linoleum blocks and make prints from them
  2. Related Subject Matter
    a) Knowledge of woods suitable for carving
    b) Knowledge of source, production, and kinds of leather
    c) Uses and kinds of plastics, and the place of plastics in the industrial world
    d) Value of knowing a craft or having a hobby

VII. Safety Instruction
  1. Related Subject Matter
    a) Safety practices in the use of tools and machines
    b) Safety practices in the use of home devices and electrical appliances
    c) General safety practices of the home

Conclusions

The emergence of industrial arts to include many industrial experiences and wide information has convinced educators of its place in general education. Because the content of industrial arts is taken from actual experiences and contacts of the industrial world that the student may have during and after his formal school education, the objectives of industrial arts supplement the objectives of general education and contribute invaluably to their realization. The change in the American economy

that has created demand for the participation, knowledge, and interest of women has changed the scope of the industrial-arts program.

The objectives of industrial arts are as applicable to girls as to boys, and industrial arts is vitally important and necessary in the complete life adjusting education of girls. Such a program for girls should have a goal of providing richer and broader experiences than a home-mechanics course. The program should include industrial information to enable the student to be intelligent concerning the world of industry, as well as home appliances. Although many educational leaders recognize the need for industrial courses designed specifically to meet the needs of girls, relatively little action has been taken.

Most women are unaware of the complexity and vastness of our technological society and of the valuable information of that society that they should receive in the public schools. Educators receive less help from individual women and from women's organizations than they would naturally expect. Shop teachers should realize that the task of providing this instruction will fall upon their shoulders. A new field of service is opening to those who are willing to accept the challenge. It should pay dividends to teachers and leaders who seek new methods of serving their communities.

Experience, Exploration, Enrichment, Experimentation —

The Four E's in Elementary School Industrial Arts

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There is no doubt that a survey of the industrial-arts field at its many levels from pre-school to graduate college would reveal startling differences in interpretation by the many teachers. It is also probable that at no level is there a broader interpretation than at that of the elementary school, where a generalized curriculum allows for more freedom than does the normally departmentalized routine of the secondary school.

Among the important factors which are determinants in the over-all planning for the type of elementary industrial arts are ones such as space for the shop, sizes of classes, type of classrooms, the economic status of the community, the abilities of classroom teachers, and the over-all organization of special subject fields within the scope of the school curriculum. .

In many school systems there is no program of elementary industrial arts. Why? Perhaps in many instances it is due to administrative rebellion against continuing the evils of an earlier-day manual training, with its emphasis on training children to master an established pattern of tool skills. Perhaps the foundation of art work experiences has continued through the years merely as a formal program of busywork, or in training all children to master fundamentals of expression regardless of their readiness or ability to express themselves freely with a wide variety of materials.

Again, there are only a few well-trained elementary industrial-arts teachers. The preponderance of training has been aimed at the education of teachers for the junior-senior high school level. Graduates of this undergraduate program are usually unsuccessful in their efforts to adapt secondary skill techniques to the style of integrated industrial-arts teaching required in the modern elementary school. In any event, it is not probable that teaching of a formalized sequence of basic projects and skills will result in a successful program in the elementary school.

Differences at Two Levels

At this point, mention should be made of some of the essential differences between elementary and secondary industrial-arts teaching. The secondary teacher stays in his shop, waiting for classes to come to him. He teaches a specific body of knowledge to a specific group of students, and this need not vary from year to year in his planning. He rarely ever meets with other teachers except at lunch time, and there is little likelihood that what he teaches is related to what other teachers teach — at least by plan. His work is usually with boys only. The technical skills to be mastered are the same for all students, and such are duly checked off as completed on one of a series of progress charts.

The modern elementary teacher cannot work with a plan book. He must carry with him all the skills learned in undergraduate training, and also be well aware of the tremendous growth changes that elementary children experience in seven years. He works with all children and classroom teachers. An understanding of, and an ability to work with people is a significant factor in his work. He must have at his finger tips an understanding of the school curriculum and a wide variety of activities and experiences which can be used to make learning experiences more meaningful.

A Functional Program for a Modern School

As has been mentioned, elementary industrial arts can be interpreted in many ways. A good sample of what is considered a modern program can be found in the public schools of Roslyn, N. Y. With approximately 1800 elementary children in grades kindergarten through six, there is a fertile field for development of a functional program in industrial arts.

Once a small suburban community, Roslyn's growth has mushroomed since

the end of World War II. As has been true in the area adjacent to New York and other large cities, an almost continuous development has been taking place. New schools have been on the planning boards, and are being erected at regular intervals. As of the spring of 1955, there are six elementary schools of various sizes in Roslyn.

Following the same growth pattern, the elementary industrial-arts department has increased from one man in 1951 to four in 1955. Each consultant is responsible for covering about twenty classrooms. There is a shop in each school, with the necessaary complement of tools and materials. The consultants have worked intently on the development of a program which will not only be meaningful to children, but give each child an opportunity to progress at his own speed.

In conjunction with a continuing study of the curriculum by all teachers in the system, the industrial-arts staff plotted a full-scale use of the facilities in a plan based on what it calls the "Four E's" of industrial arts.

The Four E's

The *Four E's — experience, exploration, enrichment,* and *experimentation* — are considered fundamental concepts of what should constitute an industrial-arts program for the elementary school. The consultants believe that through the close co-ordination of industrial-arts concepts with the program of the classroom itself, an opportunity is offered each child to become acquainted with more of the world about him.

A typical example of expression in the *Four E's* can be found in the East Hills school of the system. Here are located approximately 650 elementary school children in grades one through six. The average classroom in the building has 25 children in the upper grades, and 22 in the primary classes. Primary grade rooms are self-contained, with a full complement of the usual facilities. The fine and industrial-arts departments share a three-room *activities laboratory* in one of the wings.

Physically, the shop is small. There is work space for 12 children and the teacher. Extra supplies of tools are carried in a variety of sizes so that they may be assigned to classrooms when special activities are being handled.

The consultants believe in the small shop in a *Four E's* type program, for it eliminates the problem of having entire classes come to the shop. The result is that the consultants then move to the classrooms and plan with teachers for group activities related to the studies of the curriculum.

Scheduling Is Important

Under this plan, scheduling assumes a high degree of importance. The consultant moves from classroom to classroom, talking with each teacher about the work in social studies, science, and the other curriculum areas. A schedule is made for the following two weeks based on the timing of the activity, and the amount of time needed to continue unfinished projects. Under this plan, due allowances can be made in advance for school holidays and vacations, class field trips, and conference days.

Some classroom teachers prefer a concentrated block of time in order to finish work in progress, and then want to devote time to other special activities for a few weeks. Thus, schedules become a flexible instrument devised to meet the needs of teachers who also have plans with other special areas. In each case, the personal visit of the consultant is a constant reminder that the industrial-arts department is a service type of organization, and that activities should be planned for all children.

Different length time blocks are provided for different levels. In general, there are three basic blocks of time — 30 minutes for grades one and two; 40 minutes for grades three and four; and 50 minutes for grades five and six.

The Group Method in Practice

The smallness of the shop requires that the group method be used almost exclusively. In the scheduling process, a class is broken into small groups the members of which usually have a common aim in coming to the shop. As an example, a class of 25 children may be broken into five groups, and then scheduled to come at different times during the planned period. On the master schedule, the consultant plots groups from different grade levels to come at the same time, so that there is no conflict of attention in the shop work areas.

In practice, the observer might see a group from a fifth grade working on an aneroid barometer for the class weather station; another group from grade three creating a model of a pueblo village, and a second grade trio of girls making a small terrarium. As mentioned before, groups vary in size depending upon the activity. There are other times when half of a class will come at once.

Some general statements can be made about each of the levels, and the objectives of the activities:

Grades 1 and 2: the elements of learning how to work with tools requiring large muscle co-ordination are introduced. Activities for these children require simple operations. Many teachers have children rebuild orange crates into usable furniture for the activity centers of the room. Each child usually makes simple toys for use at home.

Grades 3 and 4: much activity, and a heavy schedule based on social studies and science learnings. Dioramas, window boxes, science equipment, kites, and electrical experiments. A wide variety of materials and tools is used. A plan or sketch is required for each object made.

Grades 5 and 6: These are what are known as our *terminal* years, in which attempts are made to be sure that children know about and understand how to use the common tools. Chances to make personal projects as well as much more difficult science equipment for use in the classroom. A rather specific sketch or plan is required, with proper measurements shown. Shop program closely co-ordinated with classroom activities, even to the extent that consultant works with the classroom teacher in the planning and *presentation* of the material to the class. In this case the consultant may guide the entire class, accompany it on field trips, and evaluate the learnings.

In these grades, when the fine finger muscles are coming into active co-ordination many opportunities are offered to assist with the development through planned activities using clay, reeds and raffias and wood carving.

Relationship to Science

It is in science that industrial arts plays a large part in projecting information and activities for children. There is a science consultant who visits each of the classrooms once each week, and during this discussion period, plans with the class for activities. In most cases the interpretation is left to groups working with the industrial-arts consultant. Under such a plan, one sixth grade built an 80-power astronomical telescope in the shop. During spring evenings, groups of children and their parents came to the school lawn and looked at the planets and the moon. Another of the activities, done by a fifth grade, involved the making of a full-sized skeleton of the human body, with joints similar to those in nature. False teeth were contributed by a local dentist, and guidance and advice in the construction was given by a bone specialist — father of one of the boys in the class.

A museum collection is housed in three rooms in the cellar of the school, and is used for reference by all classes in the public schools. Many ideas for activities originate from a visit to the museum, and the interpretation then is carried on by class groups in their visits to the shop.

Community Relations

Parents are welcomed to the school at all times, and often participate in the activities. An interesting feature of one Parent-Teacher Association meeting is the impromptu exhibit staged by staff members of the industrial-arts and fine-arts departments. Until the day chosen by the consultants, no one knows when the exhibit will be staged. Then, during the afternoon, arrangements are made for teachers to send certain of their activities to the cafeteria room. The exhibit is set up, with cards identifying the activity and the grade level, but no pupil's or teacher's names are used. During the refreshment hour following the meeting, parents wander around and look at the exhibits. Next

morning, the children from each class come for the exhibit materials.

This display is one of the highlights of the parent-teacher association year. Classroom teachers aren't upset because they have not had to spend weeks preparing for a *big show*. Selection of materials for the exhibit is easy because there are so many activities in each room. The cafeteria is large, so a representative display from each room can be shown with no difficulty. Obviously, with this type of exhibit, the school curriculum is on display.

Parents in the community have been generous with scrap materials left over in many of their businesses, so the school receives many fine gifts each year. Much of the art and industrial-arts programs have been extended or enhanced by the quantities of metals, plastics, wood cutoffs, canvas, textiles, and leather donated by the parents.

In-Service Workshops and Aids

The four industrial-arts consultants have worked closely in planning for system-wide improvement of the program, and in each of the past four years have extended some form of voluntary service to the classroom teachers in the district. In-service workshops were offered for three years. During the 1954–55 year, the group sent to each classroom teacher a one-page mimeographed bulletin each week, designed to offer suggestions for an activity in science, social studies, arithmetic, or music in which industrial-arts know-how and materials are available. Punched to fit the teacher's notebook, a file of these suggestions was started this year, and will be continued throughout the rest of the school year.

Among the titles issued to date are *How To Make a Kite, Making Blueprints, How To Make Individual Rulers, Humidity Indicators, A Geography Game, How To Make an Abacus*, and a series on *Classroom Finishing Techniques*. In some instances, the sheets apply to primary grades, and in some intermediate, and some for all.

Mass Production Techniques

The department has experimented with mass production as a technique. It was the thought that children in our public schools do not have opportunities to explore this concept which plays such a major part in the everyday life of most American people. Children use the results of the system every day of the year, and in fact have little chance to know about any of the basic home life of an earlier day in our history when everything was done at home by dint of hard labor.

It was discovered that through an error bookcases had not been ordered for the intermediate classrooms when the school was opened in 1951. It was proposed that an organized mass production project could build these for the 16 classrooms if every child would do his bit. With much explanation, and class planning, the over-all organization was set in motion. Lumber was ordered, based on calculations made by a sixth-grade class. Each class chose a foreman; cutters; first sanders; assemblers; second sanders; first, second, and final finishers. Working in the two shop areas, it was understood that the teacher would cut the dado slots, but otherwise would do no other work except replenish supplies.

Starting on a Monday morning, the various teams came to the shop on the call of the foremen. The following Monday morning, the 16 bookcases were lined up in the corridor, and the foremen came to choose the one for their respective classrooms. There were no identifying marks. In all, 403 children participated in the construction.

Since this experience there have been many more, including a Christmas gift-making organization that made 367 toys, games, and puzzles for children in orphanages and hospitals. The wrappings were all made in the same fashion. Children helped in the distribution and made it a happier Christmas for all concerned.

Concepts in Instruction

Certain concepts are fundamental in the instruction pattern followed in the Roslyn elementary industrial-arts program. Serious consideration was given to the question of how far the instructional pattern should go in projection of activities.

At East Hills, the laboratory is small compared with the shops in some of the older schools. Certain problems in shop management stem from the over-all organization of the school. However, the consultants agree on a core of understandings which will serve as a guide in all instruction. These understandings are:

1. *That a skill is never taught as such.* The prime motivation may be either an activity or a personal project but with our scheduling system the child comes in order to do a certain job. The consultant demonstrates a skilled technique to no more than five children at a time and as though it were for an individual child. As the children go to work he keeps a careful eye on their individual progress.

2. *The consultant assumes the role of partner in each operation.* The child comes to learn and so the consultant works with the small group, giving instruction where needed. Where large numbers of similar pieces are required, cutting is done on machines by the instructor. The role is one similar to that which would be played by a father at home, except that all hand operations which a child can do are left for the child.

3. *Grouping is left to the classroom teacher.* The teacher knows which children will work well together. It is her responsibility to be sure that all children come to the shop, and have equal opportunities.

4. *The shop is no place for playing.* Under ordinary circumstances, each child has an assigned task, and no discipline problems are expected. It is understood by all children that they will be sent back to the room immediately if there is any horseplay.

5. *A group is responsible for its own work space and tools — but no more.* We don't want to have children spend most of their short work time cleaning up all of the machines, workbenches, or floor. Each group is responsible for its own tools and work space.

Reaction of Secondary Teachers

An obvious question is: "What is the reaction of the secondary industrial-arts staff to the developing elementary plan?" With only four years of experience under the expanded program it is too early to pass judgments. Assuming that no true evaluation can take place until children who started in the first grade under the elementary program enter into the junior-high school program seven years later, we can only take at face value random comments expressed by the secondary staff.

The comments at this time are favorable. According to the junior-high teachers, the students now entering, after four years of elementary school industrial arts, have a better grasp of the shop and how to use it; know tools and how to use them; are familiar with a wide variety of materials; have a basic knowledge of drawing interpretation, and are more able to work independently on projects of their own choosing.

Functional Industrial Arts

The elementary industrial-arts program as it is now envisioned and in progress in the Roslyn public schools seems to be best described by the term *functional*. With its close relationship to the classroom program, it becomes a type of escape valve for children, as well as providing close contact with our *Four E's*. It is hoped that what very often constitutes formalized rote learning can be translated into experience learning as more and more experimentation takes place.

This brief description of the Roslyn experimental program does not attempt to discuss the variety of problems which come up in the day-to-day schedule. The consultants treat each problem with care, for between the classroom teacher and himself must be decided a fitting program of activities suited to meet the individual and collective needs of the class. As so often happens, a common unit of study may be decided upon by all classroom teachers of a certain grade level, yet in the final analysis there may be many distinct approaches and methods used by individual teachers to achieve the same ultimate goals.

How effective the present plan will be for the future will depend upon the

continued evaluation of the strengths and weaknesses by all of the educational staff concerned. As it is now handled, the elementary industrial-arts phase of a child's education in the Roslyn schools seems to have significance to him. At this halfway point, we can only state that we believe that the child's needs for opportunities to express himself are being met through our *Four E's* — experience, exploration, enrichment, and experimentation.

May It Be Adopted in Many Schools —

The TV Classroom

R. C. GLAZIER
Director, Public Information
Public Schools
Springfield, Mo.

Largest of the Springfield public schools' almost one thousand classrooms is the *Television Classroom*, which has been a regular weekly visitor in the homes of millions of families in Springfield and its greater surrounding Ozarks area for more than 300 sessions in three and a half years.

Television Classroom arrived in Springfield right along with television itself in March of 1953. On the first night of programming on Springfield's first local television station, KTTS-TV, channel 10, a *Television Classroom* presentation was seen. It was a film program from the school system's curriculum library. *Television Classroom* Programs were seen daily at 6:30 p.m. on KTTS-TV during the first three months of channel 10's operation. Weekly session started in June of 1953.

Because of the record of service held by *Television Classroom*, a regular flow of guests from other cities and states has observed presentations through the years.

Television Classroom is viewed regularly in 86 per cent of Springfield's television-equipped school homes, and its viewership ratings place it among top network offerings in popularity.

Television Classroom, unlike all other classrooms in the Springfield public schools, does not close for the summer months. However, the format undergoes a change each summer as programs are beamed more toward providing worthwhile summertime activities for vacationing school pupils.

Because of the widespread acceptance and tested effectiveness of *Television Classroom*, the school system's No. 1 video showpiece, other short-fun television productions have been telecast by the Springfield public schools from time to time for specific purposes. In 1953–54, *Telecampus* a weekly report on school activities on KYTV, channel 3, was produced. In February of 1955, a series entitled *Tele-Spell*, in the form of a video spelling game for elementary school children, had its inception on KTTS-TV, channel 10, and that Saturday morning series is being continued. A program of youth news telecast by youth, entitled *Teen Time Topics*, was originated during the 1955–56 school year under auspices of journalism departments in Springfield senior and junior High Schools.

The Springfield public schools television production staff includes 1000 staff members and more than 15,000 students.

Television Classroom Goals

The objectives of educational television productions of the Springfield public schools are supplemental to implementation of the school system's educational philosophy.

Goals of *Television Classroom* are:

- to keep the public informed regarding operation of the Springfield public schools, including what is taught, how it is taught, and why
- to present a balanced picture of the range of educational activities in today's public schools, in all curriculum areas and at all grade levels
- to contribute toward fulfillment of the school system's inherent obligation to offer resources of the schools for adult education
- to motivate pupil learnings and to provide in-service training for teachers through demonstrations in a wide variety of subjects with emphasis upon skill of performance, creativity, and imaginative approach

Industrial-arts projects of these Springfield public schools junior high pupils will be Christmas gifts for parents. The boys and their projects are shown during a recent appearance on the school system's "Television Classroom"

Industrial-arts instructors from Springfield's public schools, who participated in a recent television classroom program on industrial education. Left to right, Ralph Doty, Jarrett; Arthur Shockley, Central; Harry Erb, Jarrett; Ted Kistler, Study; Arch Cochran, Reed; Henry Moon, Pipkin; and Allen Gwin, Reed. At right, a test of workmanship on a newly-constructed industrial-arts project — a reading lamp — is administered by Pipkin Junior High School industrial-arts teacher Oliver Oberlander (center) on a recent television classroom production on industrial education

- to provide both teacher and student participants a working acquaintance with television, a mass communications medium destined to play an ever increasing part in the world in which they must lead useful lives.

As supplemental objectives, the office of public information attempts through its regular weekly bulletin "Radio & TV Notes" to develop the concept that both television and radio are potent tools for education and that all must assume a share in development of programming trends.

Programming Procedures

A wide variety of programs and types of presentation helps to increase viewer appeal in *television classroom*. During the first three years of *television classroom* presentations have covered not only virtually every curriculum area and grade level from one through 12 but also casts from all 36 units of the school system.

An attempt is made during a given programming period to include a wide range of curriculum areas, grade levels and schools from all geographical sections of the school district.

Ultimate selection of subjects and casts is worked out by the public information office, in co-operation with directors in other divisions of the school system in whose areas of responsibility the subject is included.

However, every member of the Springfield public schools staff is urged to help in the selection of subjects to be dealt with on *television classroom*. Forms to be used in recommending television program subject matter are available through school public information representatives.

Subjects about which parents or other citizens most frequently ask questions are those to which priority is given. All staff members can assist in the identification of these subjects in which interpretation and illustration is needed.

Occasionally, trends in volume of *television classroom* mail responses on particular subjects offer guidance in programming, too.

COATED CARS CONTAIN CONTENTED COWS

The contented cow will be catered to right through the last trip to market when a new railroad cattle car replaces present wooden-sided types. The new stock car will be of steel bars with a quarter-inch-thick coating of oil-based rubberized insulation material. This will eliminate cattle injuries and expensive cattle car repair jobs stemming from broken wooden slats. Producer, shipper, and consumer alike benefit from oil's contributions to commerce. — *Petroleum Newsnotes.*

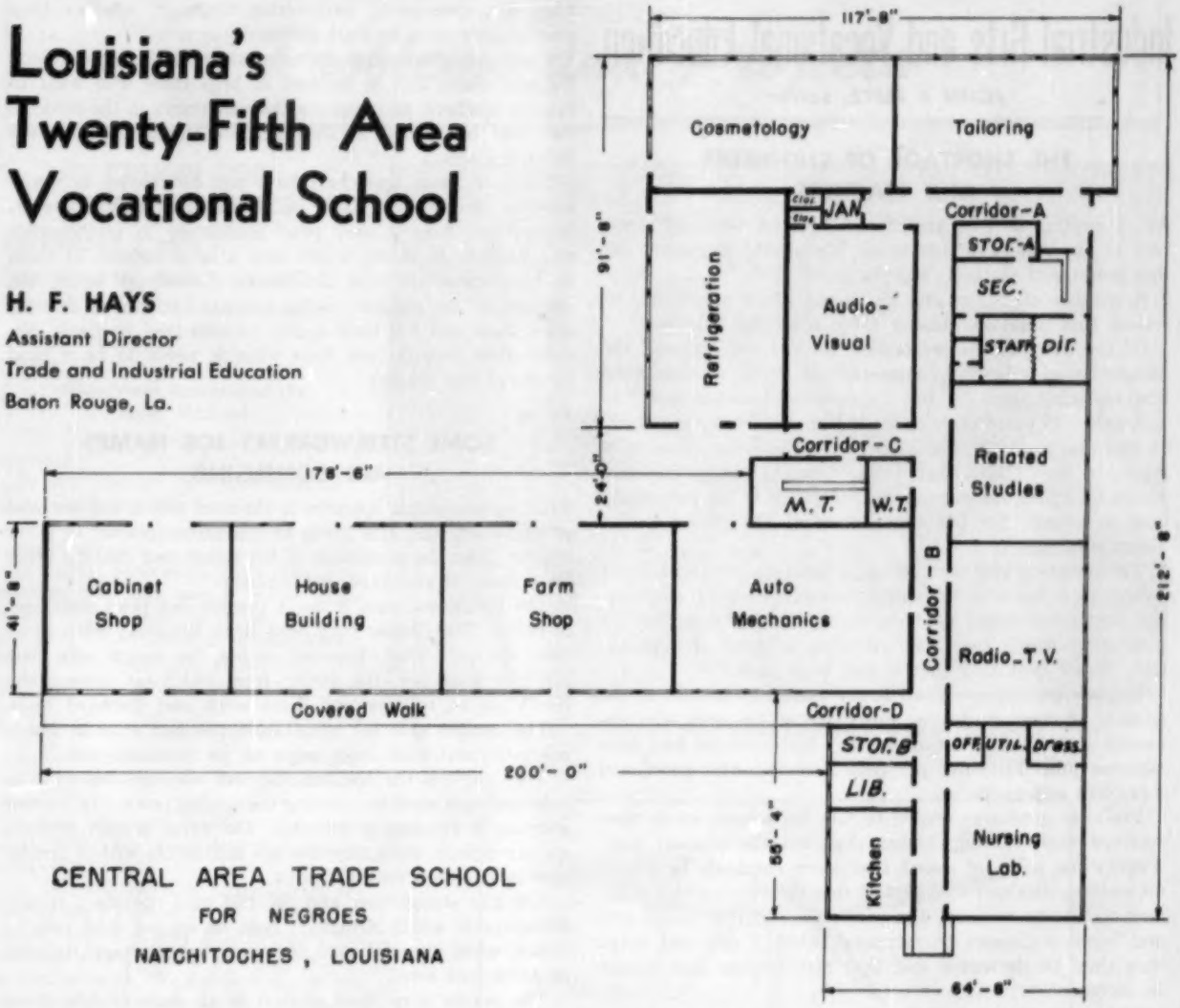
SAFE AND HUMID

In tunnels excavated as part of the Oahe Dam construction in South Dakota, engineers have found that humid air helps prevent crumbling and cave-ins. They have set up a complete humidification and ventilation system to keep moisture in the tunnel air at a constant 95 per cent level. Vital part of the system is flexible tubing of nylon coated with neoprene rubber, an all oil-based combination. The tubing, 30 inches in diameter, provides fresh air as well as the needed moisture, which enters the system through water and air sprays placed at intervals in the tunnels. — *Petroleum Newsnotes.*

— Wm. S. Hanks, Western Illinois State College, Department of Industrial Arts, Macomb, Ill.

Louisiana's Twenty-Fifth Area Vocational School

H. F. HAYS
Assistant Director
Trade and Industrial Education
Baton Rouge, La.



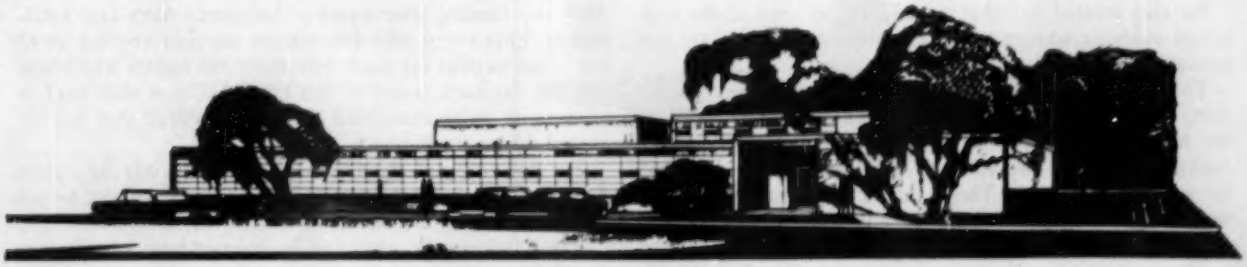
CENTRAL AREA TRADE SCHOOL
FOR NEGROES
NATCHITOCHES, LOUISIANA

Another area vocational school for Negroes has been created and established by the Louisiana Legislature. The Central Trades School in Natchitoches, La., is being built and equipped from a $250,000 appropriation. Affairs of this school will be administered by the State Board of Education.

In line with recommendations by the local advisory committee, the building was designed to house the following shops: auto mechanics, cabinetmaking, cosmetology, farm mechanics, housebuilding, practical nursing, radio-television, refrigeration and air conditioning, tailoring.

Until the Delta Area Vocational School in Monroe is completed, this school will serve the northern section of the State. In addition to the shops in the school itself, five other shops will be operated in the following city and towns within the trade school area: carpentry — Minden; carpentry — Ringgold; farm mechanics — Gibsland; housebuilding — Arcadia; housebuilding — Farmerville.

Since the establishment of the U. S. Patent Office in 1836, about 3000 patents for processes designed to tap the vast quantities of petroleum in the nation's oil shale deposits have been granted. — *Petroleum Newsnotes.*



The Central Trades School, Natchitoches, La.

Industrial Arts and Vocational Education

JOHN J. METZ, Editor

THE SHORTAGE OF ENGINEERS AND TEACHERS

AT A meeting held in August at Cleveland, Ohio, by members of the American Society of Mechanical Engineers the dire shortage of engineers was discussed.

A number of suggestions was made which might help to relieve this situation. Among these were the following:

Of the 220 persons responding, 34 per cent favored the suggestion of relieving engineers now doing routine work and replacing them by less highly-trained technicians.

Another 26 per cent were for higher salaries for engineers. It was also suggested by 22 per cent that educational programs in high schools and colleges should put greater emphasis on selling the engineering profession to the youngsters now in school. Six per cent expressed the doubt that a shortage existed.

The members also were asked to rate their own school and college experiences in preparing themselves for the engineering profession. Most of them rated the job done by the institution which they had attended as good or superior. Only 6 per cent said that it had been poor.

Engineering colleges fared better than high schools in the opinion of their graduates. Forty-one of the men who answered stated that the colleges they had attended had done superior jobs. Fifty-five per cent answered with good, and 4 per cent with mediocre.

Pre-1946 graduates tended to rate the schools where they received their training higher than did the postwar men. Twenty-one per cent urged that more emphasis be placed on mathematics and science, and that the number of specialized courses be reduced. Ten per cent voted that liberal arts and business courses be increased, while 9 per cent voted that they be decreased and that mathematics and science be increased.

Six per cent voted that college courses be extended to 5 years or more.

As all of the readers of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION know, there also is a serious shortage of teachers of every kind. Probably we could try to discuss methods for solving our problems at our national AVA and AIAA conventions which will be held in the not too distant future. At least none of us doubt that there is a grave teacher shortage.

Dean Thorndike Saville of the New York University College of Engineering stated recently that the greatest stumbling block to the engineering freshmen is insufficient preparation in physics and mathematics.

He also pointed out that "nearly 50 per cent of the high school students who enroll as engineering freshmen are not graduated."

To help these young aspirants to the engineering profession, Dean Saville began an experimental summer program for high school graduates to give these students a better background in the two subjects which prove so troublesome to so many students. These experimental summer classes were started three years ago. It was received well enough to warrant repetition last summer and again this summer.

The courses are voluntary and receive no college credit. They are open to all engineering freshmen, whether they plan to enter the New York University or not.

Probably summer courses for students desiring to become teachers could also be devised to help those who want to become teachers, and improve their shortages in the subjects that will be needed as they prepare themselves to teach industrial arts.

Many of these applicants have had no courses in woodworking, drawing, in fact, in no shop subjects whatever. Many, too, have a very poor foundation in mathematics and English. It surely would help a large number of them to have some of these deficiences cleared up before the burdens of the regular teacher preparation courses descend upon them and kill their spirits because they suddenly discover that they do not have what it needs to be a good industrial-arts teacher.

SOME STEELWORKERS JOB NAMES ARE CONFUSING

THE middle pulpit operator in the steel mill is not one who preaches sermons. His job is to manipulate a lever in a bar mill to direct the movement of hot rolled steel through roller lines, shear, straightener, and hot beds.

The knock out man is not a pugilist but pries metal out of molds. The dresser may be a Beau Brummel when away from the job. That, however, is not the reason why they call him a dresser. His duties, from which his name is derived, are to reshape and dress worn and damaged tools.

The hanger gets his name from the fact that he hangs ready-to-paint steel fence posts on an overhead rack.

Then there is the hot bed tongman who uses his tongs to hold and turn steel bars during the cooling process to prevent warping or twisting of the ends. The swing grinder removes surface defects from steel blooms and billets with a grinder that swings on a movable pivot.

The gag straightener and the end man operate a power-driven press which straighten bent or warped steel rails or plates, while the end man ties wire bands around bundles of galvanized wire.

The reader may think that it is all bosh to talk about monkeys in a steel mill. The monkeys are holes for tapping slag from blast furnaces, and the bosh is the center section of a blast furnace.

You may also be surprised that kidneys are removed in steel mills, but kidneys to the steel worker are growths of waste matter on the bottom of Bessemer converters. These must be removed from time to time.

Sinkheads are the excess metal on top of a cooling ingot, and bumped heads are bowl shaped steel closures used on the ends of boilers and tanks.

THE 1956 INDEX

ARE you binding your copies of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION into volumes, or are you keeping all of the issues in piles for ready reference? No matter which way you file the back issues of this magazine, you may want to refer to an index containing all of the material that has appeared during the last year.

For your copy of the 1956 index, write to our circulation department at once. A copy of this index will be sent to you as soon as it is off the press.

These indexes are printed in limited numbers only. Be sure to ask for your copy at once.

Problems and Projects

DESIGN FOR SHOP TEACHERS

ALEXANDER F. BICK
Teacher in Milwaukee Schools
The Milwaukee Downer College
Milwaukee, Wis.

Aluminum Bowls and the New Method

The given process teaches an industrial approach.

It offers contacts with new materials.

It vividly portrays the present concept.

It clearly shows an industrial attitude toward method.

It shows how efficiency results from methods previously used in school shops. Bowl forms are used for various types and shapes of bowls, and also for lamp shades, food covers, birdbaths, plates, trays, and table tops.

How to Design a Bowl

1. *Consider function first.* For example, a fruit bowl. This dictates its size and shape.

2. *The material.* Aluminum, 14-gauge, 2 SO. This limits the method of production somewhat.

3. *The teacher.* It is assumed that the teacher has found sources of a professional nature with which he has previously associated before choosing the projects described herewith. The teacher's mental picture controls the authenticity and quality of the result.

4. *The pressing method.* Use of shop-made synthetic resin dies. This opens the way to new experiences for the student. He also uses the same resins for attaching the base units to the bowls.

5. *Equipment.* Shop pressure devices. (Low pressures). This limits the method to shallow pressing. The result of this analysis gives us the general functional form of the bowl, namely, a shallow, contemporary, aluminum fruit bowl, 8 or 9 in., in diameter, standing on a contemporary base. Consider style second.

This dictates form and the visual aspect. Schools cannot justify any but the style of the time — the contemporary style.

The nature of contemporary style are: cleanness, simplicity, newness, freedom, and spontaneity. These are expressed in clean surfaces, symbolizing the wide-open spaces, and the freedom of an air age. The base, also being open, and off the table, symbolizes the *off the ground* and *in the air* concept of the air age.

This article submits the opinion that

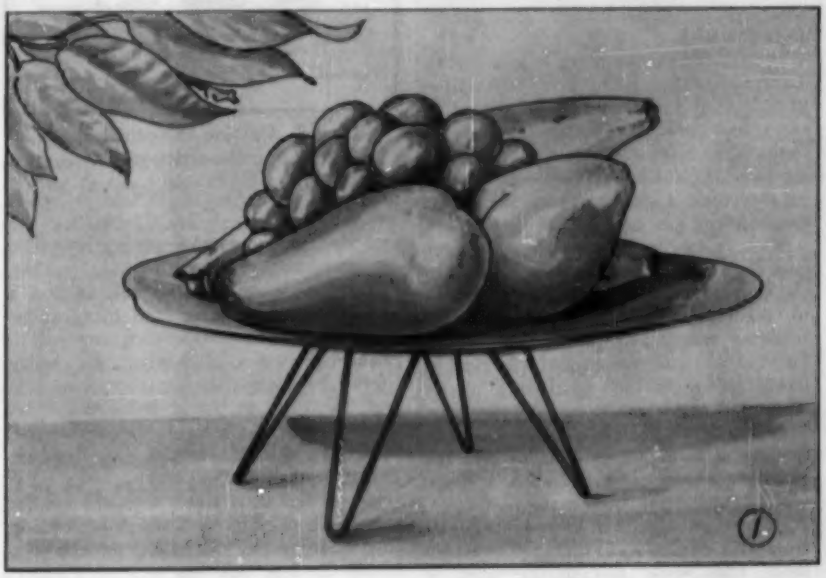


Fig. 1. Aluminum fruit bowl pressed in a shop made die

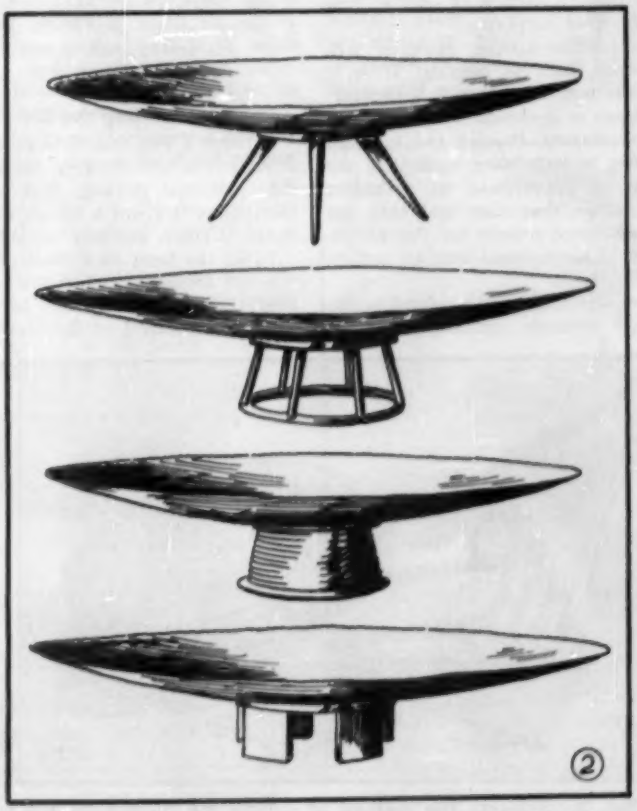


Fig. 2. Aluminum fruit or sandwich bowls with bases

whether the boy lives in a tenement or in a period house, schools should teach him the design of the day. Obviously, schools should not be obliged to foster or to condone obsolescence or any degree of backwardness in people. Schools should be stable and dependable dispensers of advanced concepts and forms of an esteemed professional type.

The teacher on the other hand needs to know contemporary design by association with it. It is amazing to observe in many cases, how understanding the teacher becomes after a few months of faithful leafing through professional journals containing the cream of contemporary furnishings and building.

When a teacher is thus alerted to the true forms of the day, he will with understanding resist the tendency in many shops to decorate metalwork. The decorating tendency was in vogue some years ago, but today, there is no need for it. The bowls shown in this article are utterly plain and open on their large surfaces. Why so plain? Their quality lies in their serenity of form, and in their dignity. The plainness is principally an emphasis of the fruit. Actually, the fruit is the decoration. Were decoration added it would subtract from this emphasis. For example, a scalloped edge would destroy the unity of the concept, and it would certainly dispute the dominance of the thing the bowl was made to hold. The greatest emphasis is obtained through dignity of setting; that is, through utter simplicity.

Let us consider another example: artificial texture such as peening. If it is conspicuous over the setting, it is amateurish. Etchings of irrelevant subjects are in the same category. Peening and etchings, and chasing as well, being symbols of the past, are not appropriate for a modern metal such as aluminum, and they are not a well-chosen process for this period, regardless of the material they are applied to.

The projects and methods offered in this article are typically contemporary. The method of pressing, for example, is typical of industrial procedure. Industries are quickly turning to the making of filled punches resin wherever these are feasible. They cost a tenth of the amount that a steel punch would cost, and they can be made in a tenth of the time required to make steel dies. Industries use epoxy resins, or epoxy-polyester compounds. As yet, the toxic nature of some epoxy formulations eliminate them from school use. Castoglas, a Castolite Company product, recommended in this article, is safe for schools, and it is equal with epoxies for every school purpose. Thus it is possible, by following the directions, to offer students this late industrial method. Furthermore, by this method, schools may produce dies quickly and easily, opening wide the door to new possibilities never before within the scope of the school. The cost of the die shown in Figures 7 and 8, is about $2.50. This cost is easily absorbed in the charge for the project.

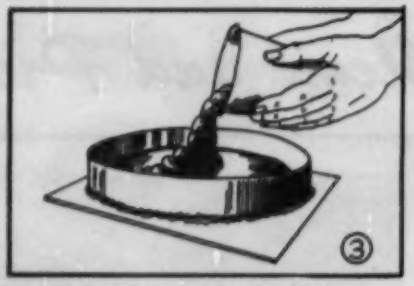


Fig. 3. Casting the punch in a cardboard wall

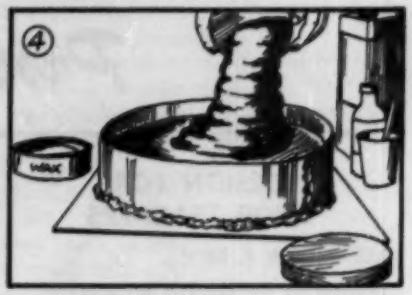


Fig. 4. Casting the die over the punch using glass filled Castoglas resin

Building the Die

1. Shape a 9-in. disk of 14-ga. aluminum, 2 SO, into a bowl form, ¾ in. deep, using the traditional method. Wax both sides thoroughly. Or, turn a convex wood form, shellac 3 coats, and wax thoroughly.

2. Set the form on a sheet of glass.

3. Set around it a cardboard wall to extend 1¼ in. above the rim of the form. Seal the cardboard to the glass with hot wax. Also, cover the inside wall with hot wax, and at the same time, seal the inside joint between form and wall with wax. See Figure 3.

4. Mix the resin. Castoglas is ideal for school use, and its strength is more than adequate for our purposes. In fact, the die made with this resin will take pressures in excess of 5000 p.s.i.

Mix 15 oz. Castoglas Liquid Resin with 30 oz. of clean course sand and a 3-oz. cup of Ground Glass Fiber, plus 2 tsp. Castoglas Hardener. Mix well and pour into the cardboard wall to the top. Allow this to harden.

5. Peel off the cardboard, and remove the form with a thin knife or spatula. This is the female mold.

6. Set the mold, just made, concave side up, on glass. Smooth with sandpaper, if not smooth. Then wax thoroughly.

7. Build a cardboard wall around it, its height ½ in. above the rim of the mold. Seal this to the glass with hot wax as before, and be sure to seal the cardboard joint as well. Wax the inside wall plus the joint at the mold rim. Do not drop wax on the mold itself.

8. Mix 15 oz. Castoglas Liquid Resin with sand, Ground Glass Fiber, and Hardener, as before, and pour it into the mold to the top. To save resin, make a 4-in. wood disk and embed it at the center of the casting as shown. When hard, strip off

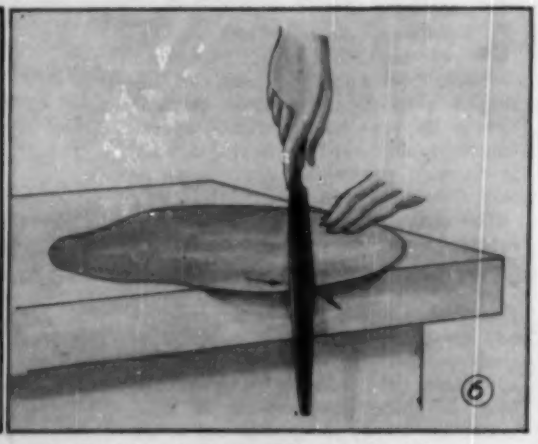


Fig. 5. Showing the method of cutting the aluminum disk for the fruit bowl. Fig. 6. Filing method for heavy aluminum

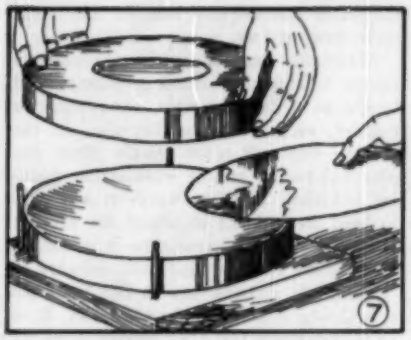


Fig. 7. Placing the aluminum disk into the dies. The guide pins are for easy alignment

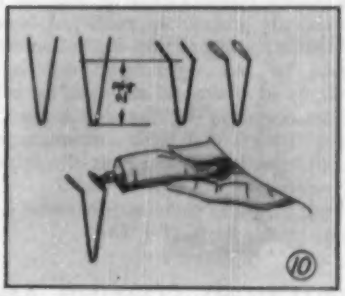


Fig. 10. Legs bent from brass or aluminum wire. Cement them temporarily to the bowl with model cement

the cardboard, separate the castings, sand, and do not use until next day.

Making the Aluminum Bowl

1. Cut a square of aluminum, 9 by 9 in.
2. Find the center, and describe a circle, 8¼ in. in diameter.
3. Cut off corners of the square, not cutting into the line. See Fig. 5. Use the shears as shown, pressure on the table as well as closing the shears by hand.
4. Cut around on the line as illustrated.
5. File edge, using the file in the position shown in Fig. 6.
6. Place the disk into the die, and press in any device, clamps or letter press if none other is at hand.
7. If slight ripples appear, tap them out with a leather covered mallet over the die, as shown in Figure 9.
8. Cut the rim, if you prefer to a free-form shape. See Figure 6.
9. Polish both sides with a paste of pumice and water on a cloth, using a circular motion.
10. Make legs. Five types are illustrated. Annealed ⅛-in. brass wire 7¼ in. long each, bent and flattened slightly, and fixed to the metal with jewelers' or model cement. The cementing is temporary and precedes embedding in resin. See Figure 10.

Annealed 26-ga. sheet brass, cut as shown in Figure 11 and pressed in the die, also shown in Figure 11, and then closed to tear-drop section by side pressure of a knife while still in the die. Make 3 or 4. See Figure 2.

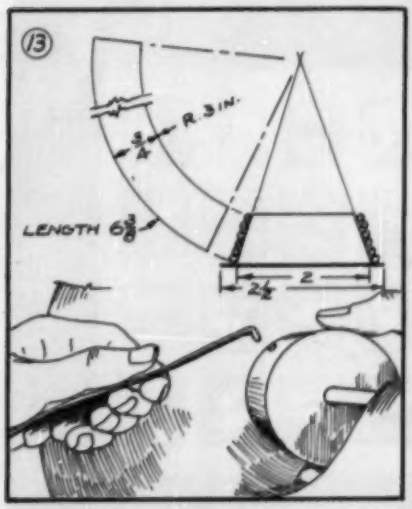


Fig. 13. Copper wire wound hollow cone for the base unit of the fourth bowl showing how the wire winding is begun

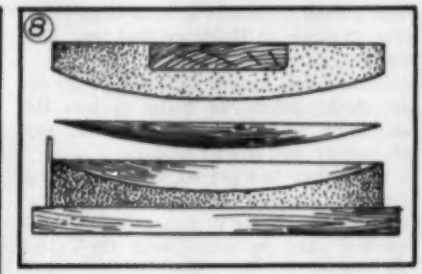


Fig. 8. Cross section at center line of the die on a wood base. The pressed bowl with the punch above it

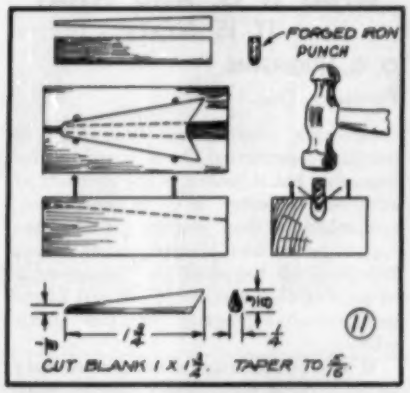


Fig. 11. Wood dies for making legs of sheet brass blanks by pressing or driving an iron punch into the groove of the die

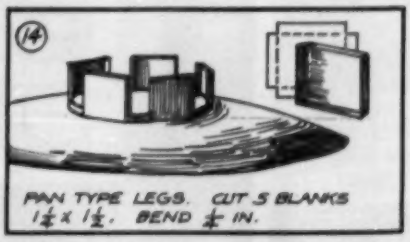


Fig. 14. This shows an assembled block or pan type base, its members embedded in Castoglas resin

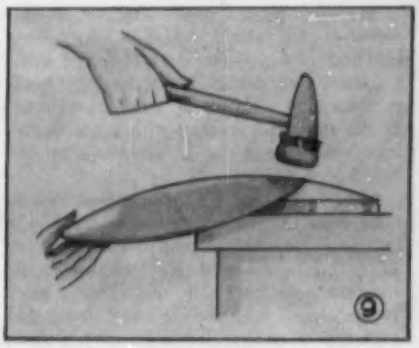


Fig. 9. Tapping out any irregularities left from the pressing

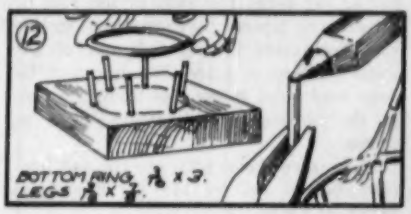


Fig. 12. Brass base made of rod members. These members are tinned with solder before assembly to the bowl

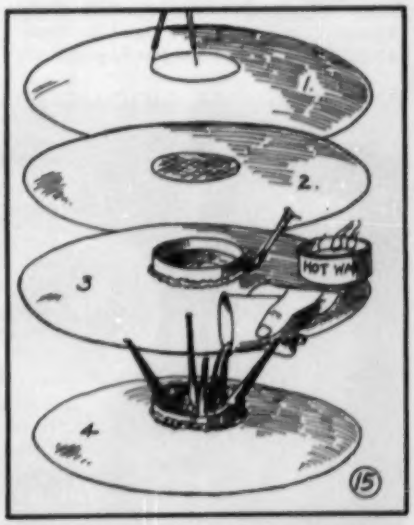


Fig. 15. To embed base members: scribe a center circle; cut into the aluminum deeply to roughen it; set up a cardboard wall around the circle, and pour the Castoglas. The leg members are held in place with a drop of model cement

Annealed 5/16-in. brass ring, 3 in. in diameter to which 6—1-in. legs are soldered by flame after each is tinned with a soldering copper as shown. Legs are held in holes in a wood block. They are filed to fit the ring, and notched with a file where they enter the resin, as explained below. See Figure 12.

Soft sheet copper, 22 gauge, bent into a cone from the pattern developed as shown in Figure 13. This should overlap at the joint and be soldered. To the bottom of the cone solder a 2½-in. disk. Drill a hole at the top edge of the cone and insert the bent end of an annealed ⅛-in. copper wire. Wind the wire tightly around the cone to the bottom (about 6 times) and solder the end to the cone. The ends of the wire fit better when tapered by hammering. In this way they come in and fade out of the spiral with more grace. Winding may be done over a rod in the vise through a hole in the bottom of the 2½-in. plate as shown.

26-ga. sheet brass pans are cut and bent from blanks 1¼ by 1½ in. in size, as shown in Figure 14.

11. Because of the difficulty of soldering aluminum, and also because of the ease with which we may attach the leg units with resin, we will use a modern method. Each of the five types of leg units illustrated are attached in like manner. Figure 15 shows the four steps used:

Scribe a 2¼-in. circle on the center of the bowl bottom. Cut deeply within the circle with a knife to roughen the area.

Set up a cardboard wall, ¼ in. high, sealing it with hot wax.

Set in the leg unit. In the case of legs 1 and 2, the single members are cemented temporarily to the aluminum with model cement. Other types will stand by themselves. Mix 2 tblsp. Castoglas Liquid Resin with a small amount of Ground Glass Fiber plus 30 drops of Hardener, and pour into the cardboard wall.

When hard, remove cardboard, trim up the Resin, polish the brass, re-clean the aluminum with pumice and water, dry thoroughly, and lacquer all over.

Here, then, is a project which takes less time than the writing, and which gives students an experience in a modern industrial method that embodies both thrill and learning.

MINIMALIC CONSTRUCTION — WHAT IT IS, AND WHAT IT IS NOT

O. G. HUGHSON
Portland, Ore.

Minimalic construction is an ABC of building construction. It is a primer for beginners, but it embraces the elements of advanced carpentry. It is an inexpensive, comprehensive shop program for all-season use. It serves best for prevocational boys and gives all beginners the fundamentals of building construction. It is a part of the industrial-arts program of the public school.

Minimalic construction does not embrace or comprehend the enclosed, finished building. That is why it is minimalic and not miniature construction. It does not seek nor attempt to tie in or teach any other allied building trade than carpentry. It is strictly and solely elementary carpentry. It does not expect more shopwork from builder boys than may be reasonably expected of pupils in the regular periods allotted to this subject in one term of school. Primarily it is *consumer education* for future homeowners, whether they build their own, or buy.

Minimalic construction is a beginner's course in carpentry framing, planned and taught in a direct, simple, comprehensive manner, elementary and boy-size, so the average boy will more readily grasp the practical points in this work-action learning situation. In other words it will tend to hold the student in school for another year, while at the same time it is setting up in him a trend toward basic industry.

Minimalic construction on this basis has a field — a distinct field of its own. It is an action-study for *hand-minded* boys, of great assistance to the teacher-in developing the construction aptitudes of his class. As such, it is an important part of both the general guidance program and the industrial-arts program of public education.

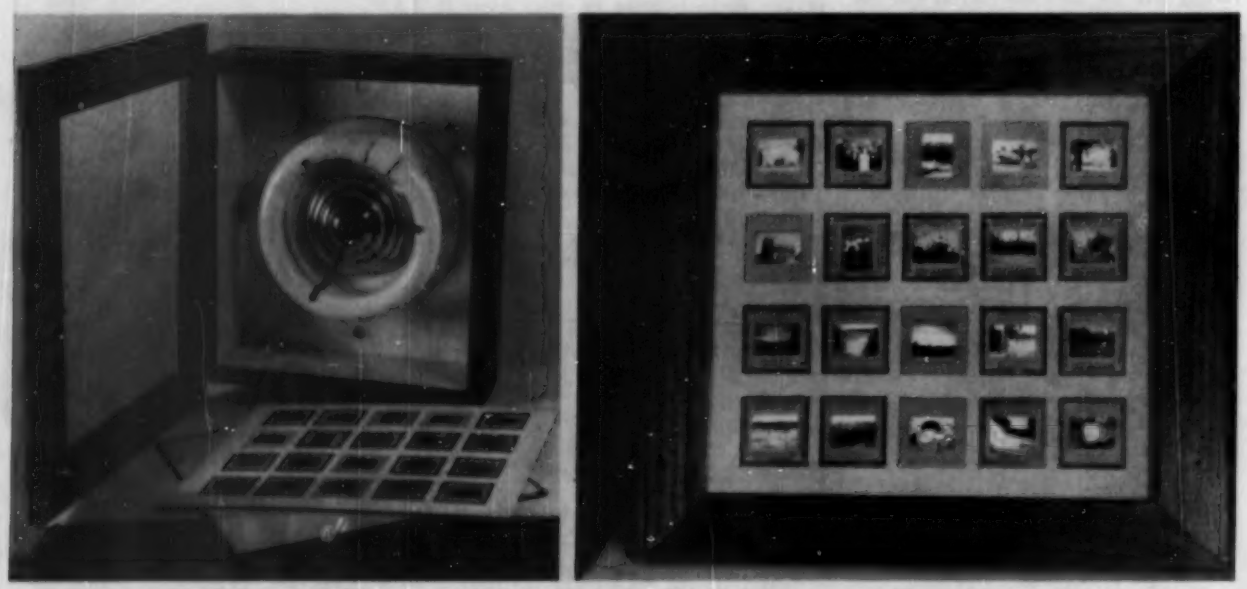
Minimalic construction has a powerful appeal to boy psychology, requires a modicum of bookwork, and calls for little reference work in the library. It is a work-study situation that holds a strong appeal for all boys. It has been especially helpful in *problem* cases.

Write: State Building Congress, 515 Henry Bldg., Portland 4, Ore.

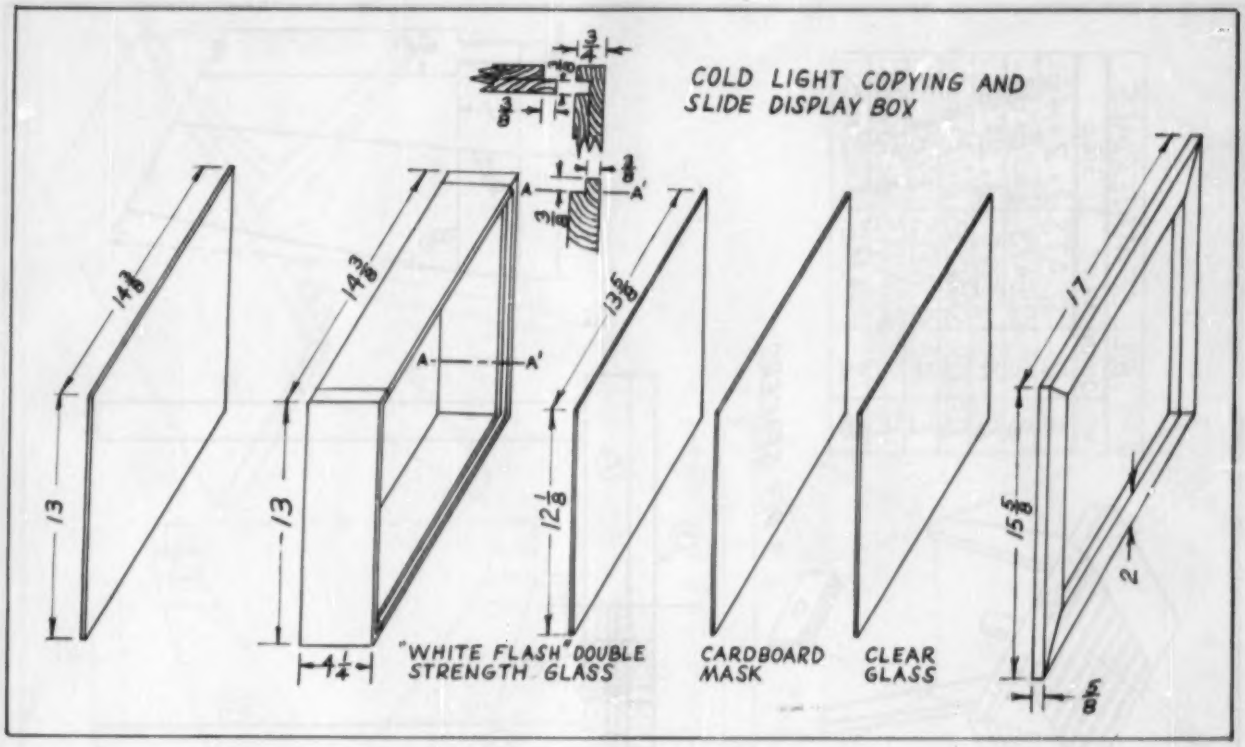
COLD LIGHT COPYING AND SLIDE DISPLAY BOX

CORNELIUS J. SPINOLA
Graduate Student
University of Washington
Seattle, Wash.

This multi-purpose box can be constructed in a junior or senior high school shop and is readily adaptable to many class and home situations. It can be used



Cold light copying and slide display box



Details of the cold light copying and slide display box

by an instructor for the tracing of line drawing for mimeograph stencils, or for tracing pictures to glass slides or paper. The use of a cold light eliminates the heat problem, making it ideal for displaying color transparencies of any size without damage. A glass front further protects the slides from dust and finger marks. Its construction permits it to be used as a shadow box or a glassed display case for small articles. The hinged front makes it easy to remove the glass and masks, while a friction catch holds the glass securely when closed. Soft or hardwood may be used, depending on the type of finish desired.

BILL OF MATERIAL

No. of pcs.	*Name of part*	*Size*
2	Box sides	⅜ x 4¼ x 13⅝ in.
2	Box sides	⅜ x 4¼ x 13 in.
1	¼-in. Plywood back	13 x 14⅜ in.
2	Frame	⅝ x 2 x 15⅝ in.
2	Frame	⅝ x 2 x 17 in.
1	"White Flash" double strength glass, 13⅜₁₆ by 12⅜₁₆ in.	
1	Clear glass, double or single strength, 13⅜₁₆ by 12⅜₁₆ in.	
1	Cardboard mask, size of glass, cut to take transparencies	
1	Circline, cool white fluorescent light fixture to fit	
	Electric cord, plug, and toggle switch	

Square all pieces to size. Lay out and cut gained joints on box sides. Cut ⅝ by ⅝ rabbets on the long pieces, while the short 13 in. pieces are cut with *stop* rabbets, using a dado head and finishing with a rabbet plane. After trial assemblies the box is glued. Frame members are also glued. The inside of the frame should be of the same dimensions as the inside of the box.

Apply white enamel to all inside surfaces, including that side of the back panel to which the fixture will be attached. Bore a few holes in the panel to allow air circulation, and fasten the fixture. The frame is hinged to one of the sides, and a cabinet door catch on the other. The "White Flash" glass is a product of the Paul Wissmach Glass Company of Paden City, W. Va., and may be purchased at most glass distributing agencies. In the event this glass is not available, frosted glass may be used, though light diffusion may not be as good. Squares measuring 2 by 2 in. are cut out of the cardboard mask, the number depending on the slides to be displayed. Apply the finish, and fasten the back panel, thus completing the box.

For tracing purposes, the drawing is placed between the glass panes, while the closed frame holds the stencil or paper securely. When used as a model display case, the clear glass may be held tightly by using cardboard strips in the rabbets. Dimensions may be readily changed to accommodate any size of circular fluorescent light.

For arctic ambulation, there's no shoe like a snowshoe — and no snowshoe like the new ones made from steel cable encased in oil-based *nylon* set in feather-weight magnesium frames. These novel snow-travelers, developed with the help of metal and oil-industry capital and know-how, are said to outmush snowshoes made by old Eskimo experts. — *Petroleum Newsnotes.*

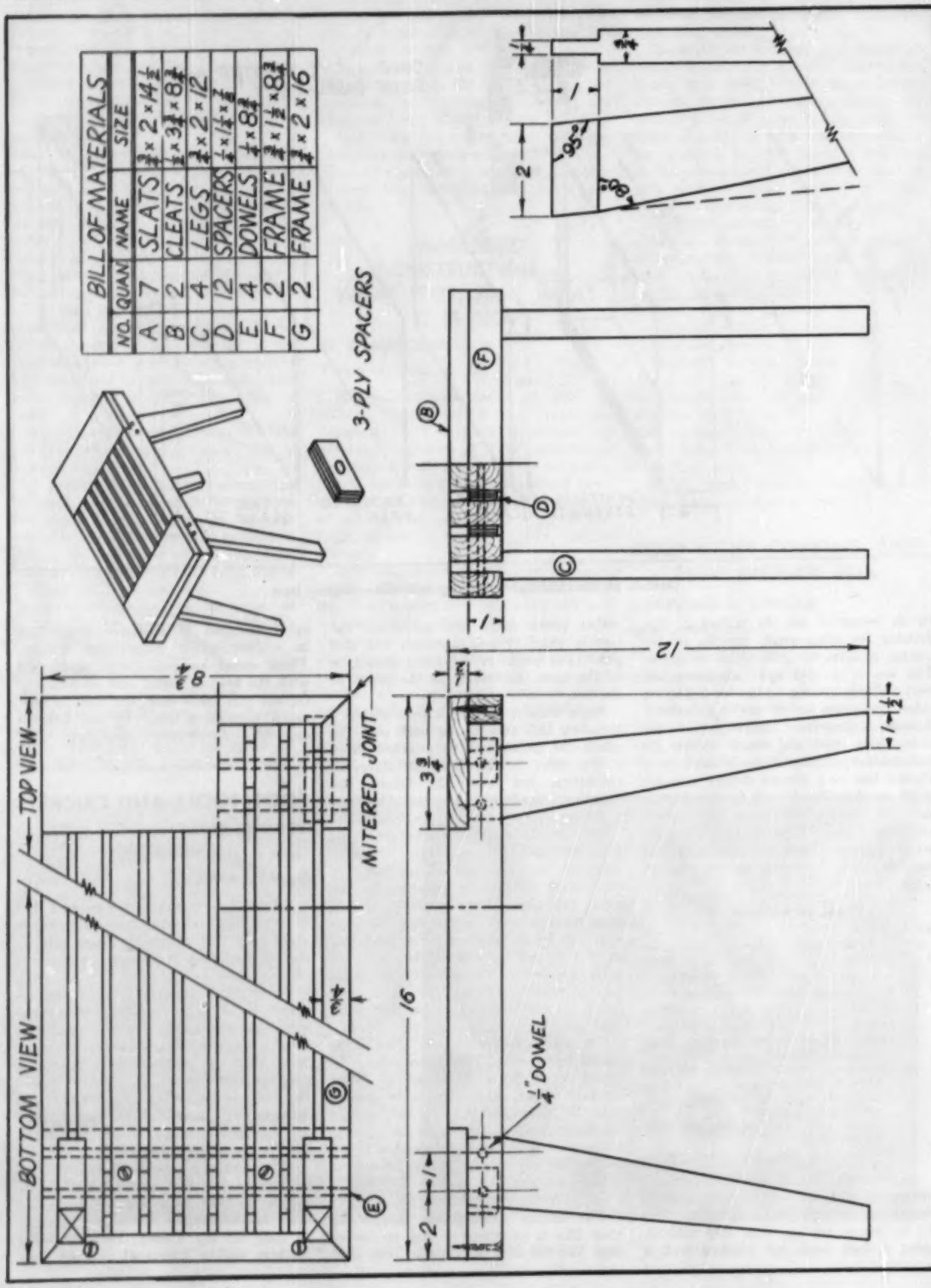
FOOTSTOOLS AND CRICKETS

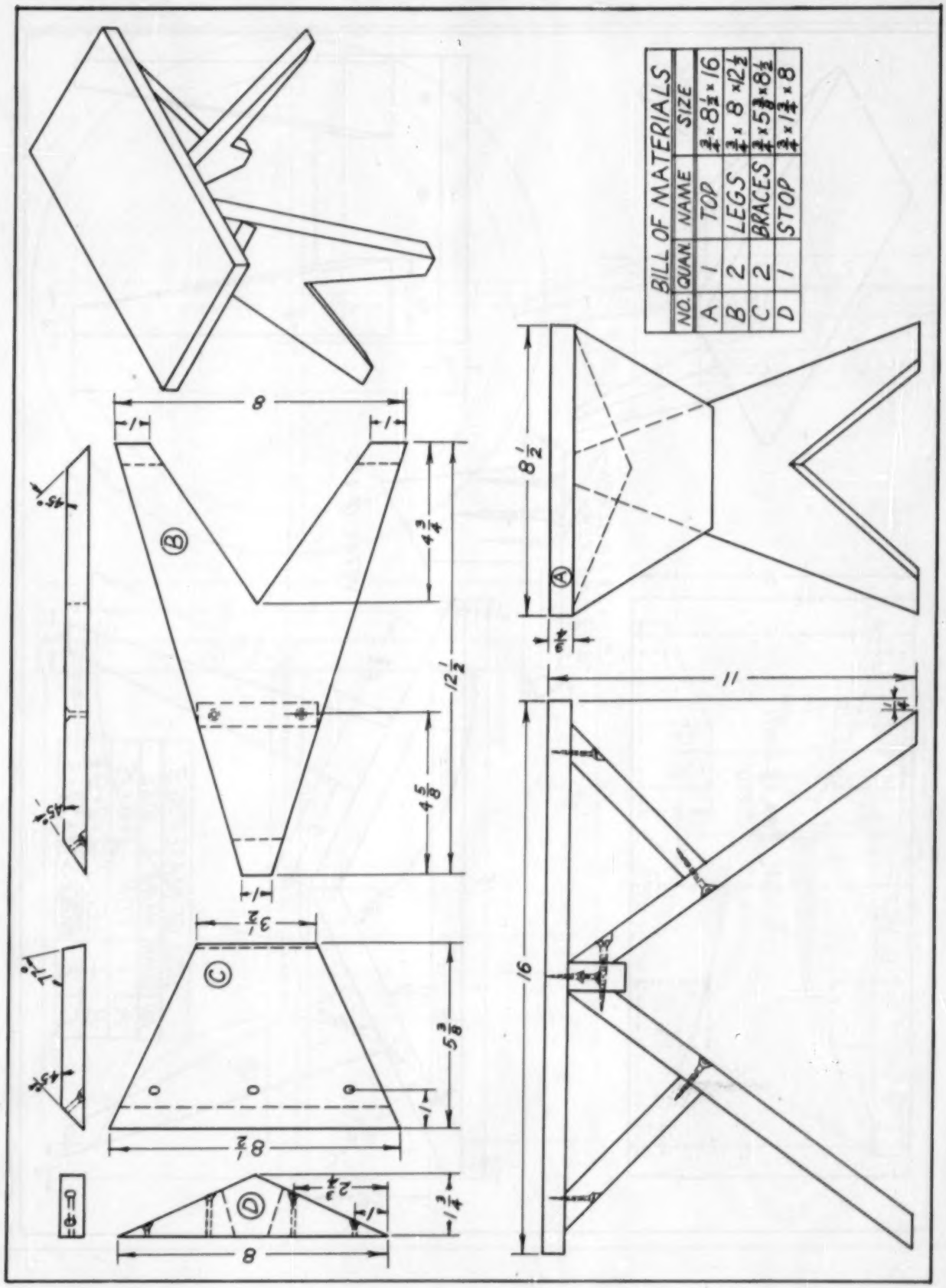
JOHN A. CAREY
Saint Mark's School
Southboro, Mass.

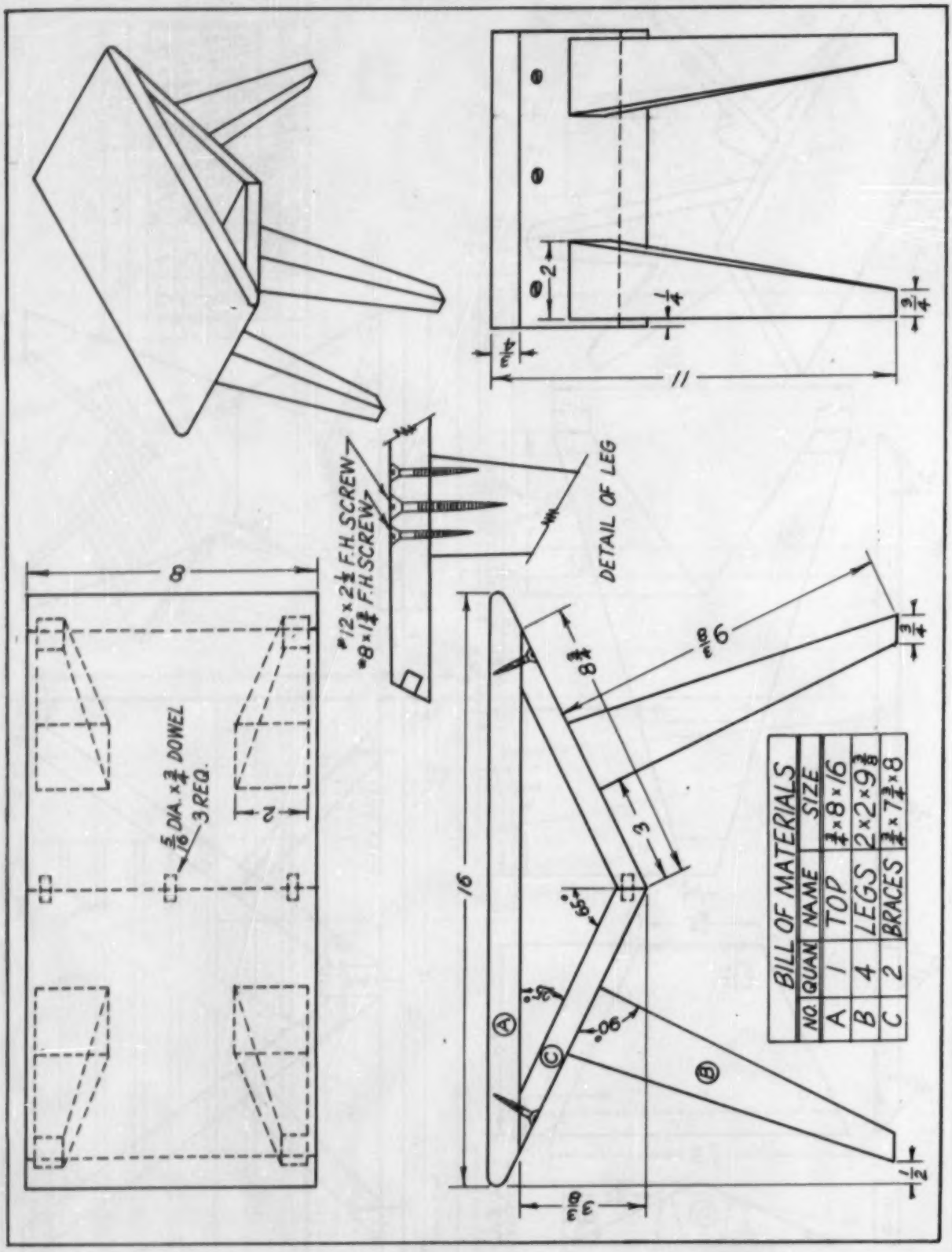
Footstools and crickets are projects that bring to mind the old manual training program. For this reason they are held in disdain by many industrial-arts teachers of today.

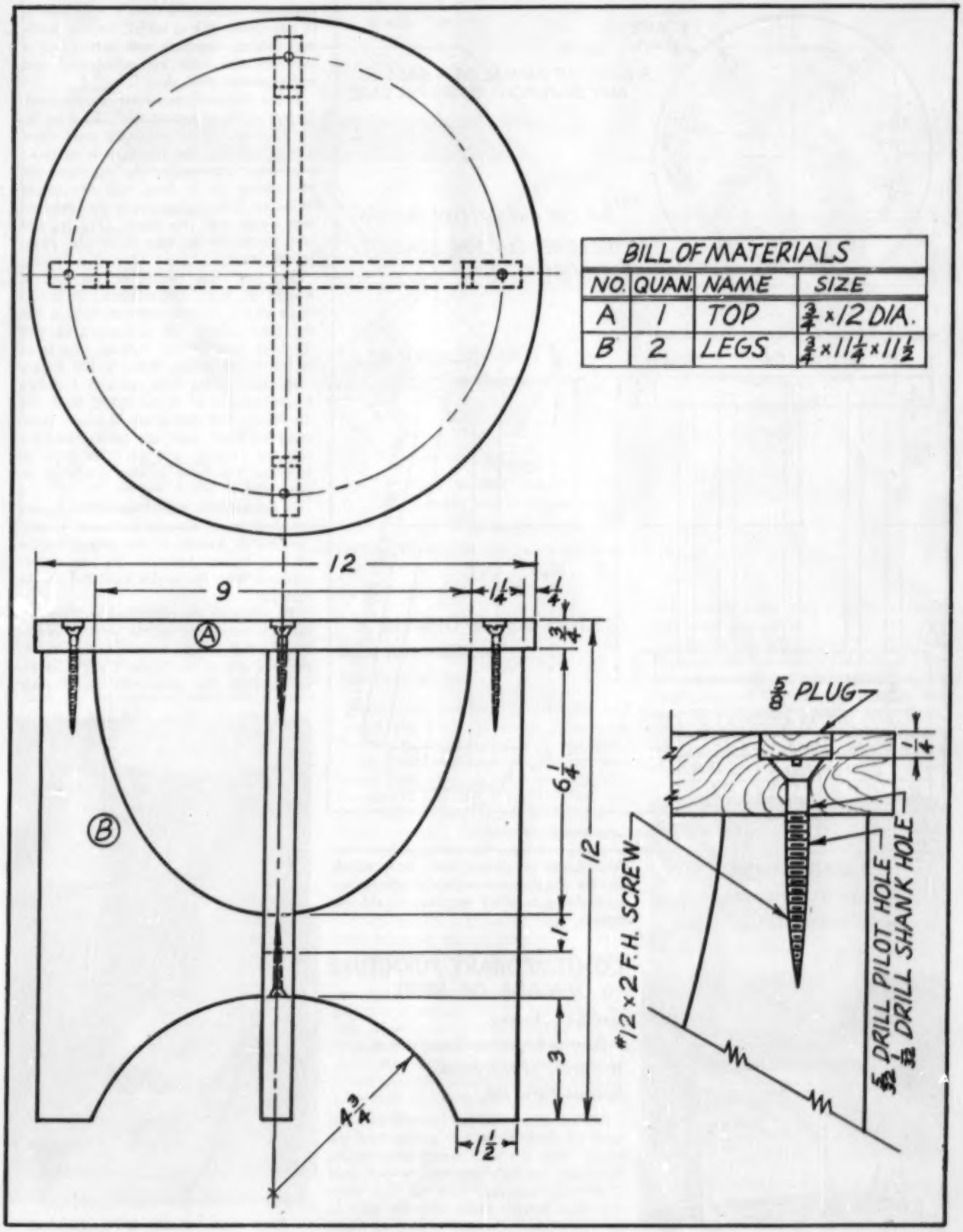
A revival is imminent, for a stool or bench, 10 to 14 in. in height, for youngsters (and occasionally oldsters) when they watch television. There seems to be a need, then, to consider them as school projects again. After a search, I found that the material on the subject was pretty meager. There were plans for period pieces and typical mortise-and-tenon joint stools, but few contemporary ideas.

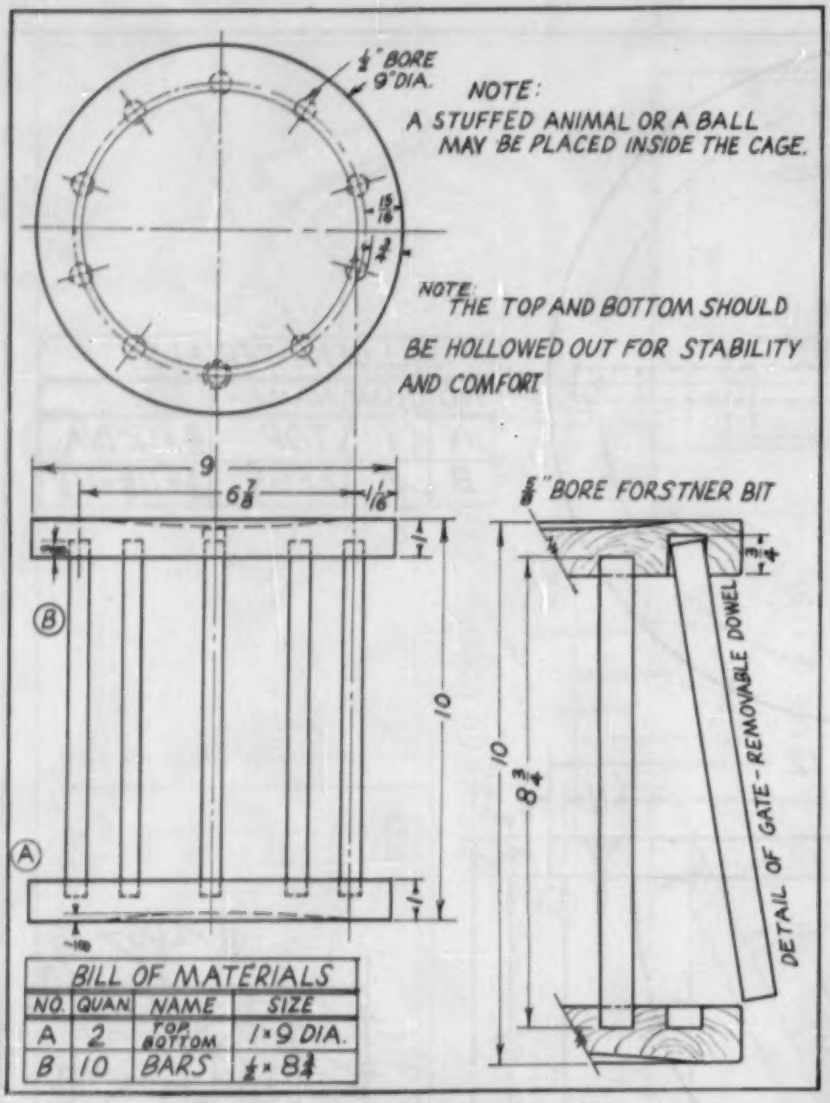
After making a number of experimental drawings I felt that others might be interested in just such plans. I, therefore, drew up the samples shown on pages 332 to 336, for my classes. Probably other teachers will be interested in them, too.


BILL OF MATERIALS
NO. QUAN NAME SIZE
A 7 SLATS ¾ × 2 × 14½
B 2 CLEATS ¾ × 3½ × 8¾
C 4 LEGS ¾ × 2 × 12
D 12 SPACERS ¼ × 1¾ × 2
E 4 DOWELS ¼ × 8¾
F 2 FRAME ¾ × 1½ × 8¾
G 2 FRAME ¾ × 2 × 16
3-PLY SPACERS
TOP VIEW
BOTTOM VIEW
MITERED JOINT
¼" DOWEL
8
12
16
3¾
1½
2
1
95°
85°


BILL OF MATERIALS
NO. QUAN NAME SIZE
A 1 TOP ¾ x 8½ x 16
B 2 LEGS ¾ x 8 x 12½
C 2 BRACES ¾ x 5⅜ x 8½
D 1 STOP ¾ x 1¾ x 8
8
8½
11
16
12½
4¾
4⅝
5⅜
3½
1¾
2¾
45°
A
B
C
D


DETAIL OF LEG
#12 x 2½ F.H. SCREW
#8 x 1½ F.H. SCREW
5/16 DIA. x ¾ DOWEL 3 REQ.
BILL OF MATERIALS
NO | QUAN | NAME | SIZE
A | 1 | TOP | ¾ x 8 x 16
B | 4 | LEGS | 2 x 2 x 9⅜
C | 2 | BRACES | ¾ x 7¾ x 8


BILL OF MATERIALS
NO. QUAN. NAME SIZE
A 1 TOP ¾ x 12 DIA.
B 2 LEGS ¾ x 11¼ x 11½
12
9
1¼
¼
A
¾
6¼
B
12
1
3
4¾
1½
⅝ PLUG
¼
#12 x 2 F.H. SCREW
⅝ DRILL PILOT HOLE
1½ DRILL SHANK HOLE



Plans for a stool and materials needed

Although this stand can be made with few tools, the project offers a wide variety of experience such as layout, cutting, bending, welding, finishing, and particularly a familiarization with hot rolled steel rod and expanded steel sheet.

If the suggested measurements are used, 20 feet of ⅜-in. square steel and 4 sq. ft. of 18-gauge, ½-in. expanded steel sheet will be needed. The first step is to make two square frames. For the top frame cut two pieces 12 in. long, and two pieces 24 in. of ⅜-in. square stock. For the bottom frame, cut two pieces 11¼ in. and two pieces 18 in. long from the ⅜-in. square stock.

The front legs consist of two 30½-in. lengths of ⅜-in. square stock. At a distance of 4½ in. from one end make a 140 deg. bend using a vise or bending jig. For the back legs cut two 14½-in. lengths of ⅜-in. square stock. Make a 130 degree bend three inches from one end. Cut two 8¼-in. lengths of ⅜-in. square stock for the braces. The shelves are 18 gauge, ½-in. expanded sheet steel, one piece measuring 23⅞ by 11⅞ in. and the other 17⅞ by 11⅛ in. The table is then ready to be assembled.

If welding equipment is available, square the shelf frame sections and weld, butting the shorter lengths to the longer lengths of each frame. Assemble the legs in accordance with the angles indicated on the drawing.

To assemble the completed sections, lay the top frame flat on the welding bench. Place a leg section lengthwise on top of the long side of the frame. Using a square to maintain the correct 90 degree angle

End table made of expanded steel and square steel rods

LATHE STAND

E. V. REYNER
Townsend, Mont.

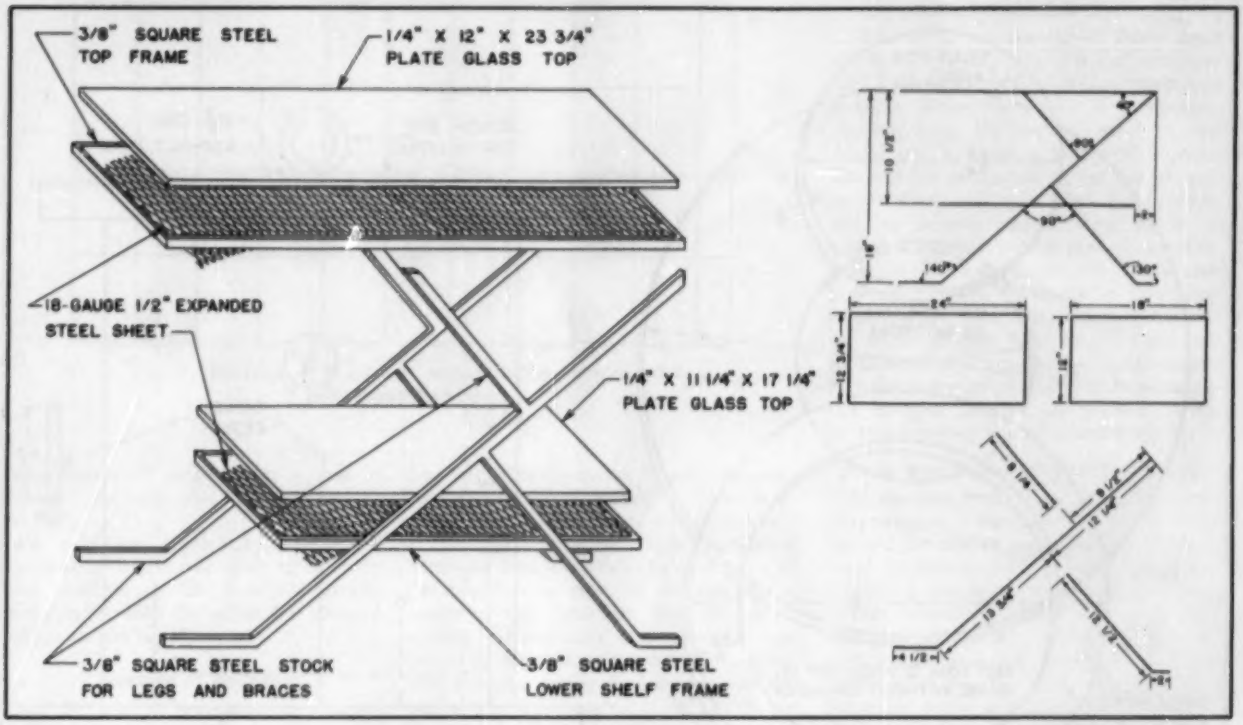
Lloyd Heberle, Townsend, Mont., industrial-arts instructor, made lathe stands like the one shown here for the school shop by welding together sections of old car frames.

A home-made lathe stand

CONTEMPORARY FURNITURE MADE OF STEEL

George L. Lipkey
Industrial Education Department
University of Maryland
College Park, Md.

The modern trend has brought iron and steel furniture from the garden into the home. There is a wide variety of attractive matching furniture that can be fashioned from this material, such as the piece described herein, which may be used as an end table, telephone stand, or night table.

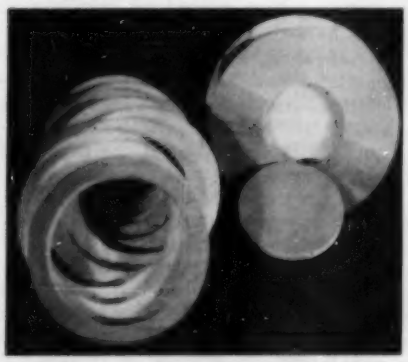

3/8" SQUARE STEEL TOP FRAME
1/4" X 12" X 23 3/4" PLATE GLASS TOP
18-GAUGE 1/2" EXPANDED STEEL SHEET
1/4" X 11 1/4" X 17 1/4" PLATE GLASS TOP
3/8" SQUARE STEEL STOCK FOR LEGS AND BRACES
3/8" SQUARE STEEL LOWER SHELF FRAME

Construction details of the wrought iron stand

weld the leg section to the top frame. Weld the second leg section in the same manner. Set the table upright and weld the bottom shelf in place, 10½ in. below the top shelf. Next, turn the table upside down, lay the expanded metal wire sections in place and weld to the frames. Finish the table by brushing or spraying it with dull black lacquer. In the event the stand is to be used outside, an enamel or paint finish may be applied.

BILL OF MATERIALS

⅜ in. square rod, by 20-ft. steel
4 sq. ft., 18 gauge, ½-in. expanded steel sheet
1 piece, ¼ by 12 by 23¾-in., plate glass
1 piece, ¼ by 11¼ by 17¼-in., plate glass



The eight rings, top and bottom, and the trap, all cut and ready to be assembled

A ROUND WREN HOUSE

DICK HUTCHINSON
San Gabriel, Calif.

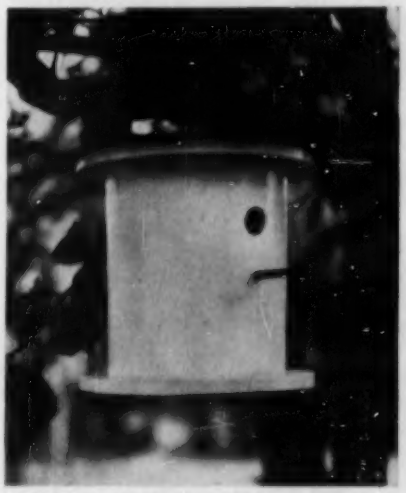
Here is a birdhouse project that will delight the heart of every jig-saw enthusiast, as this is strictly a jig-saw job.

Everyone seems to like round birdhouses, and after my years of living with the birds I find that they like them, too. Most of the round houses are difficult to build; however, this one is quite simple and craftsmen will get a lot of fun out of building this unusual piece. When completed and hung in the garden it will not only add character to the surroundings, but will provide a home for some of those little creatures we call birds.

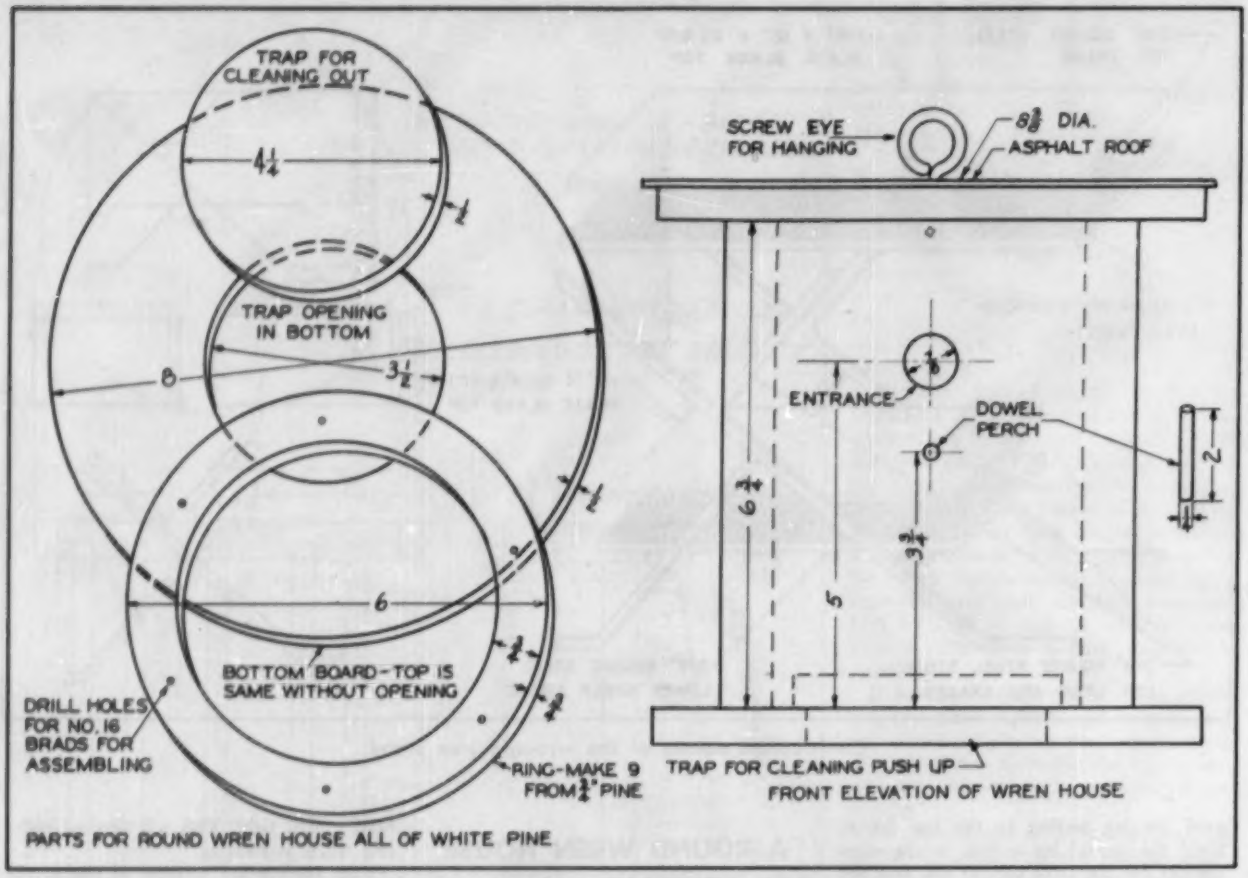
The house is built entirely from scraps of white pine. The best procedure is to lay out one of the rings on ¾-in. white pine and saw it out on the jig saw. Then use this piece for a pattern in laying out the remaining eight rings. This will result in exact duplicates and if the lines are followed closely in sawing out much time and labor will be saved when it comes to the final sanding.

When the nine rings have all been cut, lay out and cut the 8 in. in diameter top and bottom pieces and saw out the 3½-in. opening in the bottom piece, and make the 4¼-in. trap disk from the same material. Drill holes (as shown) in the rings slightly smaller than a No. 16 brad so that the brad will fit tight. This will prevent splitting when assembling.

Coat the contact surfaces of one of the rings and the top side of the bottom piece with resinous glue. Center the ring on the floor piece and brad the two together. Repeat by gluing and bradding each of the rings until the body of the house is built up. Drop the 4¼-in. trap inside the drum shaped house and glue and brad the roof



The finished wren house painted cream color with red roof. The house is hung in a tree ready for occupancy



Details for constructing the round wren house

on, then sand the assembled house smooth all over.

Drill the 7/8-in. entrance opening, and drill the ¼-in. hole for the perch and glue the dowel perch in, then drill a ¼-in. hole just under the roof in the back of the house. This will provide cross ventilation.

Paint the house with two coats of good house paint, then cut and tack on an 8½-in. disk of slate surfaced asphalt roofing material in a color that blends with the color of the house. Red for a cream colored house, green or gray for a white house, and last, set a screw eye in the center of the roof for hanging.

When the house is hung the trap door will drop down and cover the opening. To clean, just push the trap up and reach in.

This same design may be used for a bluebird house; however, the floor area should be 1 in. larger in area, and the entrance opening should measure 1½ in. in diameter.

The U. S. oil industry has drilled more than 100 times more wells per square mile of potential oil land in the United States than has the rest of the world on its potential oil lands. — *Petroleum Newsnotes.*

THE CLIPBOARD METHOD OF KEEPING FARM SHOP STUDENT RECORDS

JAMES BEARDSLEY
Farm Mechanics Teacher
Stockton College
Stockton, Calif.

In a vocational agriculture department, of which the farm mechanics shop is an important segment, several types of information need to be kept on hand by the students. A combination of shop record sheet and mimeograph forms, plus the use of student constructed clipboards, aids in solving a problem which in turn makes for easier teaching.

Construction

The approximate cost of clipboards, size 9 by 12½ in., even in quantities is 60 cents each. In a department with 125 agriculture students, this would mean an investment of $75 and might be prohibitive in cost. The use of ⅛-in. masonite and Esterbrook No. 30 Relief Ball Bearing Clips has proved satisfactory. From a 4 by 8-ft. sheet of masonite, 36 — 9 by 12-in. boards can be cut, including saw cut with only 5-in. waste. Shown on page 339 is the layout of the board. A 9 by 12-in. size is made since most papers are 8½ by 11 in. See Figure 1.

Using a power saw, the masonite is cut up and a board is given to each boy. Next, a number is marked with steel number stamps in the upper right hand corner so each boy can identify his own clipboard, and then the edges are smoothed with sandpaper.

The Esterbrook No. 30 clips are centered on the top of the boards and a 9/32-in. drill is used to drill 2 holes through the rear face of the clip and the masonite. Flat head machine screws, No. 4 — 40 by ½ in., are inserted between the jaws of the clip and through the board and the nuts are fastened on the back side of the clipboard. The excess screw thread should be cut away and the remainder peened over the nut to prevent eventual loosening and loss of the nut. Bolting the clips to the board is preferred to using wood screws, since they eventually work loose.

By purchasing Esterbrook clips in gross quantities from stationery stores, the cost is $32 with a unit price of 23 cents. A sheet of masonite costs approximately $3.60, which makes the cost of each complete clipboard (including machine screws)

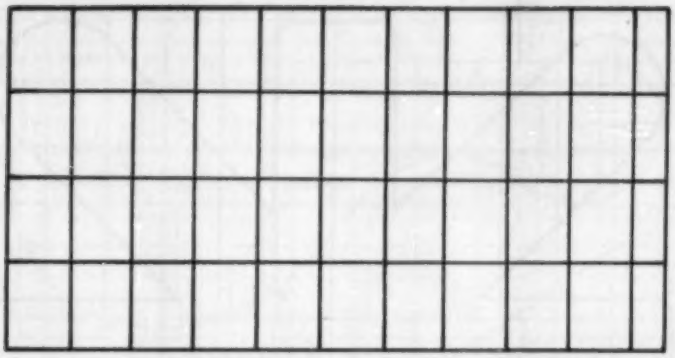


Fig. 1. Division of 4 by 8-ft. Masonite board into 40 9 by 12-in. clipboards

approximately 35 cents or for a class of 125 boys the total cost will therefore be $43.75.

For easy number identification, yellow or orange color may be used to carefully paint numbers on the face of the clip corresponding with the respective stamped number on the board.

Storage of Boards

It is essential to provide proper storage space for the boards. This should be convenient to the classroom area and accessible to the students. A rack similar to the one shown in Figure 2 is satisfactory.

The space between clipboards should be a minimum of 1 in. so papers will not be crumpled. This rack holds 80 boards. It should be noted the spaces are stenciled consecutively from 1 to 80 on the sides of the rack to correspond with the individual clipboard numbers.

Records

In the farm shop, we are concerned primarily with three types of sheets: the *Job Record Card*, the *Bill of Materials Sheet*, and the *Farm Machinery Information Sheet*. Naturally, any information relating to the boys' shop work such as notes, plans, etc., may also be placed on the board. The boards work well when used on field trips for keeping notes or filling out field trip information sheets. At times during the year, when special meetings are held and registration boards are needed by the school administration, the farm shop readily supplies them and thereby helps assist in over-all school activities.

Shop Job Cards

The primary use of the shop card is for the boy to keep a running account of his daily activities in the shop. A space is allocated for each day of the week during the quarter for a brief statement of what the boy has accomplished during the farm shop period. At intervals, decided by the teacher, the cards are checked for proper information.

Spaces for the various types of information should be provided. These categories, logically, would be designed to fit each instructor's particular needs for the students in his class. Since the cards are printed front and back, only two cards are required per boy for the year. At the end of the semester, the cards are filed in manila folders, alphabetically, and stored for four years. In the four year vocational agriculture program, during the last weeks of the senior year (12th grade), many awards are distributed. These awards are based upon the boys' previous four years' activities with his supervised farming program, his accomplishments in his agriculture class, his Future Farmers of America participation, and his work in the farm mechanics class. Therefore, a minimum of four years' storage space is desirable, about one file drawer for a group of 125 students. From this file can be obtained any boy's activities in the previous four years for compilation of his standing in regards to possible awards.

Bill of Materials Sheet

This is a mimeographed sheet upon which the boy can keep a list of materials used in the construction of farm mechanics projects. When the project is completed, the boy pays the amount owed to the school and is issued a numbered receipt. The number is marked on the bill of materials sheet and it is filed for possible auditing purposes. From these sheets is compiled information for the annual shop report which is made for the Trade and Industry Division Chairman in late May of each school year. This report includes a list of all projects built in the shop, the actual cost and approximate total value. The sheet also assists the boy in planning and thinking through his project before he starts cutting up materials unwisely.

Farm Machinery Information Sheet

An essential part of the farm mechanics shop program is instruction in tractor driving and the use of agriculture machinery. Local implement dealers are co-operative in loaning equipment for instruction and student assembly. Since so much of the machinery is basically the same, the use of a machinery guide assists the student in becoming familiar with parts and information which is similar on all models. Each sheet is made up for the types of equipment to be covered in the year and ditto copies are made for distribution to the farm shop boys. These sheets may also serve as a study guide for quizzes, reports, etc.

The maintenance of good records is an important segment of learning — even in the shop. It is a sound basis for keeping records in the high school and trains the boy in keeping the records which he will be obliged to keep of the many types of accounts in his adult life.

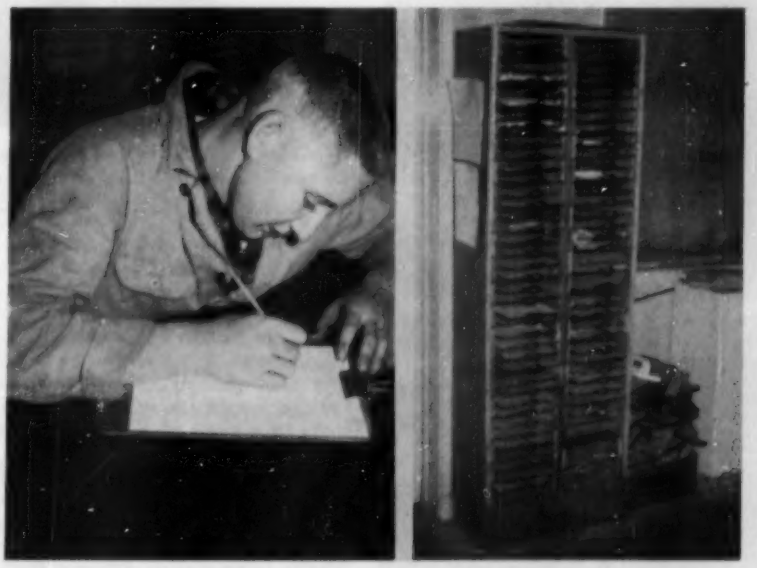


Fig. 3. Student using his clipboard; at right, Fig. 2. Clipboard storage shelf

SIMPLE ONE-PIECE CANDLEHOLDER

FLOYD A. SMITH

Shop Instructor

Public Schools

East Williston, L. I., N. Y.

This simple candleholder of one piece design is easy to make, simple in design, has student appeal and as noted, has been successfully constructed in the art and shop periods.

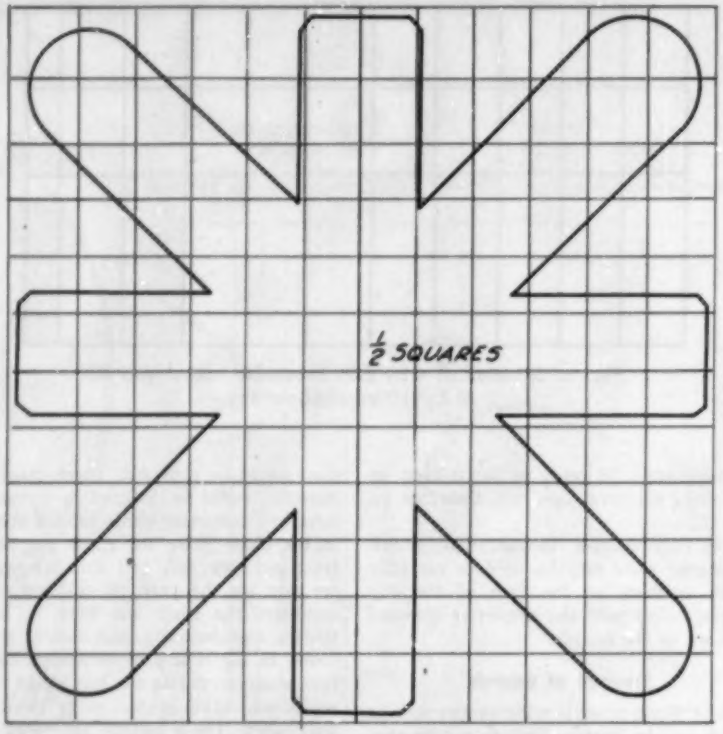
Materials: Brass, copper, aluminum, or Gar* Alloy (*Used in cut).

Tools: Scriber, snips, and file.

Procedure:

1. Lay out design on desired metal.
2. Cut accurately with tin snips.
3. File all edges carefully.
4. Steel wool or polish on buffing head.
5. Bend feet around 1-in. dowel stick, broom handle, or pipe.
6. Bend uprights to desired shape. Flare round top.

This project has been made successfully from thin brass metal in the art department by third-grade pupils.



Simple one-piece candleholder

The finished candleholder

— Photograph by L. F. Stockmeyer, Nyack, N. Y.

TEACHING AND TESTING COMMON WOOD JOINTS

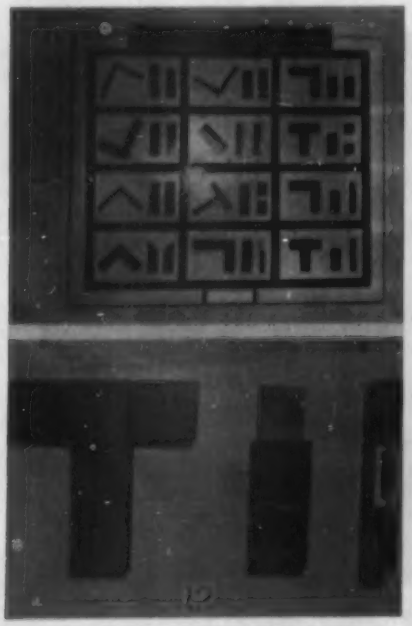
Brother Leo Geiger, C.S.C.

Shop Instructor

Father Gibault School for Boys

Terre Haute, Ind.

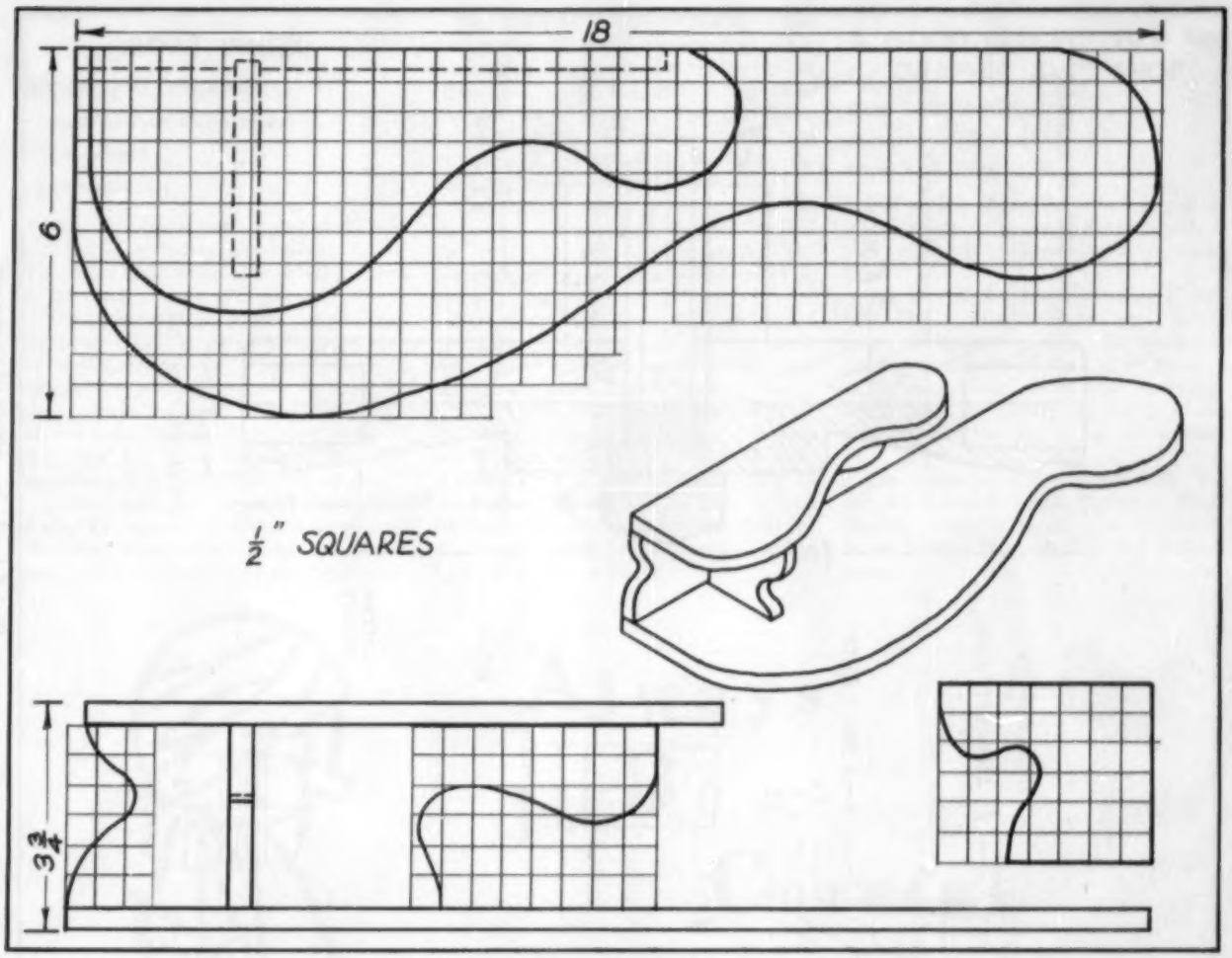
The teaching aid described herein can be made to do double duty by helping to teach the construction of the various joints as well as to act as a testing device for the recognition of the joints when the instructor wishes to check the results of his teaching. Each joint is numbered, the names being listed according to the numbers at the bottom of the panel.



Common wood joints

Each joint is mounted on a separate, 6 by 11-in. piece of ¼-in. plywood board, and the boards are in turn mounted by hooks on a larger panel for better display and more concentration. The value of this type of *joint board* comes not only from the fact that each mounted joint can be removed from its hooks on the larger panel for closer scrutiny when the individual joint is being studied, but also from the fact that the instructor can vary the board's arrangement by making additional joint boards to replace the ones studied so that the same joint display can be varied at the will of the instructor.

To aid the students better to understand the construction, each joint is mounted on its individual board completely assembled with one member of the joint painted a bright blue color and the other member painted a bright red color. To the right of each joint, the individual members are displayed, disassembled. The same color scheme is used on the disassembled members with the addition of the contacting surfaces of each joint being painted a bright yellow. The bright colors are used to help the students to see and understand the joint construction better,



Details of the free-form wall shelf by Bernard Ducker

and in addition adds decoration for the shop walls.

The construction of this *teach-test* joint panel can well be used as a shop project with the students doing most of the work under the supervision of the instructor. The colors used to paint the joints and the panels can be selected by the instructor or by the class after a discussion on the use and value of color scheming.

Over 40 per cent of the U. S. Army's personnel, military and civilian, work outside the United States in 73 foreign countries. — *Wisconsin Military Information Section.*

FREE-FORM WALL SHELF

BERNARD DUCKER

Upper Skagit Valley Schools

Concrete, Wash.

The free-form wall shelf described herewith is a good project for beginners because it provides students opportunity to rip and crosscut stock, square up stock, lay out a pattern, cut along irregular lines with a coping saw, rasping and sanding sawed edges, sanding, lay out for assembling, assembling project, nailing, gluing, and finishing.

Schedule Procedure

1. Mark off the following rectangles with ½-in. squares for:
   a) Bottom shelf — 6 by 18 in.
   b) Top shelf — 4½ by 11 in.
   c) Back support — 3 by 9½ in.
   d) Center support — 3½ by 3 in.
2. Make dots on your paper that correspond with lines on the working drawing.
3. Draw all pieces on squared paper and cut out carefully.
4. Lay pattern on ½-in. stock, following grain.

Hint: Use a blackboard eraser that has been charged with chalk dust and then pat the eraser around the edge of the pattern. The outline will be imposed upon the wood.

5. Cut out the pieces with a coping or a jig saw.
6. Square up pieces, one end and edge of top and bottom shelf, three sides of center support.
7. Sand or rasp cut edges and sand all surfaces on both sides.
8. Lay out a center line, for the center support on the topside of bottom shelf, and on the bottom side of the top shelf.
9. Assemble with glue and 1-in. finish nails.

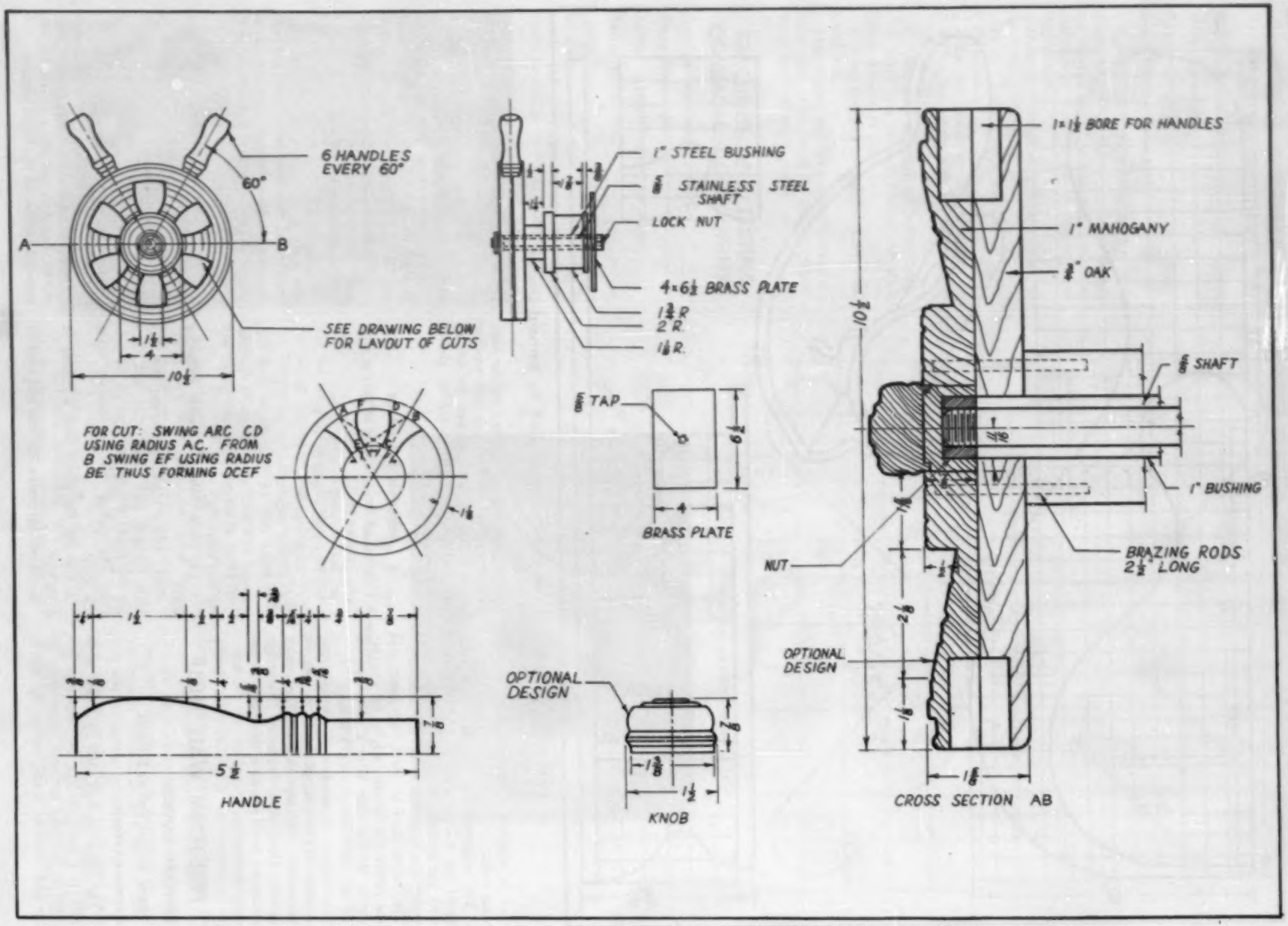
Wall fasteners (2) may be made from a tin can. Cut out two pieces ¾ by ¾ in., and make a ⅛-in. hem on the top edge. Punch and drill two holes. Put one wall fastener to back support and the other one to the outer edge of the bottom shelf.

10. Finish.

BILL OF MATERIAL

Pieces Required	*Name of Piece*	*Size*
1	Bottom shelf	6 x 18 in.
1	Top shelf	4½ x 11 in.
1	Back support	3 x 9½ in.
1	Center support	3½ x 3 in.

Tools: Rule, square, coping saw, rasp, block plane, smoothing plane, crosscut saw, ripsaw, hammer, nail set, V board, flat and rounded sandpaper blocks, sandpaper.



Details of the boat wheel constructed by industrial-arts students in the Jeanerette High School. See article on next page

BOAT WHEEL

RICHARD O. VEDRINES
Industrial Arts Department
High School
Jeanerette, La.

The illustrated boat wheel was constructed by industrial-arts students in the Jeanerette High School. The wheel pictured is the result of several trials.

The cruiser wheel is a very practical and inexpensive project. It provides a number of varied operations. It also affords a chance for several students to combine their efforts and skill to the completion of one common goal. A finished wheel of this type will retail for about $48. The material cost is a little over five dollars.

Three wheels of this type have been made. The spacer between the drum and the wheel allows a box to be constructed over the drum, thus hiding the tiller cable.

The first step in construction is to glue two pieces of 7/8-in. mahogany together, cross grain. This piece should then be cut to an 11-in. circle. The circle is then to be fastened to a faceplate and the design cut on the lathe. The faceplate should then be removed and the design drawn on the back as shown in the illustration.

The sections are then cut out on the jig saw. A jig was made in order to drill the six 1½-in. holes for the spokes. The turned handles are then to be glued in place.

The spacer and drum are then turned and fastened to the back of the wheel. As a safety measure, insert brazing rods through the wheel into the drum.

Drill a 1-in. hole through the center of the wheel and drum, and insert a bushing and a 5/8-in. shaft threaded at both ends. A brass plate is then to be fastened to the back of the shaft. This plate is used for mounting. The nut on the front of the wheel should be countersunk and a knob inserted to hide the nut.

A GOOD PROJECT FOR THE GRAPHIC ARTS SHOP

BEN TAUBENFELD
Junior High School No. 71
New York City, N. Y.

The project shown herewith was printed in the graphic arts shop of our school. It was assigned at the beginning of the school term.

The idea of this safety calendar is twofold. One is that of displaying a safety poster in each classroom; the second is keeping a calendar on hand at all times.

The picture was printed from a linoleum block, while the months are set up on the linotype, and the rest of the job is hand set.

The students who produce this job are Joe Cozzone, Frank Genovese, Patsy Marino, Billy Passano, Joe Proschuk, Israel Rivera, Peter Slavkin, and William Semler.

Always
Be
Careful

AVOID BEING CARELESS

1956 JANUARY 1956

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

1956 FEBRUARY 1956

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29			

1956 MARCH 1956

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

The safety calendar as a graphic-arts shop project

A Suggested Plan Sheet For The General Shop

BERNARD R. JOSIF
Assistant Professor of Industrial Arts
Ball State Teachers College
Muncie, Ind.

CHARLES J. FAUST
Martin Boots Junior High School
Marion, Ind.

Planning is one of the most important phases of the industrial-arts program. It is one that deserves much consideration. There have been numerous schools of thought as to philosophy and purpose of the plan sheet. Some authorities of the profession would question its use and value, and debate whether a plan sheet has any real merit as an instructional device in the industrial-arts curriculum. The writers focus on this issue to illustrate the fact that the plan sheet is not beyond criticism and realize ample opportunity exists for the improvement in its application for instruction.

If plan sheets are to become meaningful, useful, and a learning device, they should be used purposefully and made an integral phase of the program. This can best be accomplished through the leadership and guidance of the instructor. If this thesis be accepted, then the plan sheet has justified its position as an instructional device in the industrial-arts laboratory.

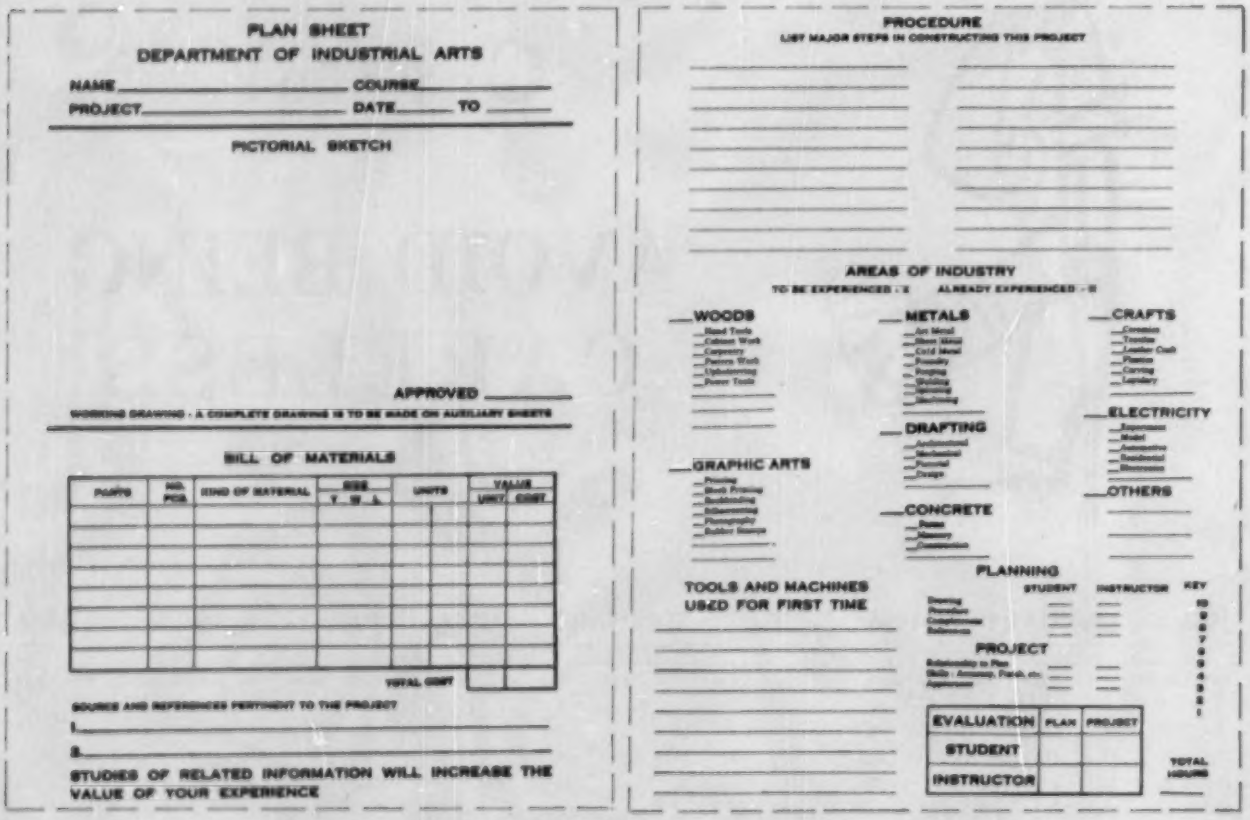
At times, the instructor does not communicate the purpose and use of the plan sheet to the student. It should be conveyed, that the plan sheet, used properly as an instruction device, is extremely helpful and valuable to the students as well as the instructor.

The casual observer might surmise the plan sheet accompanying this article is too cumbersome and involved for laboratory purposes; however, after close scrutiny it will be noted that most of the sections can be filled in rather rapidly.

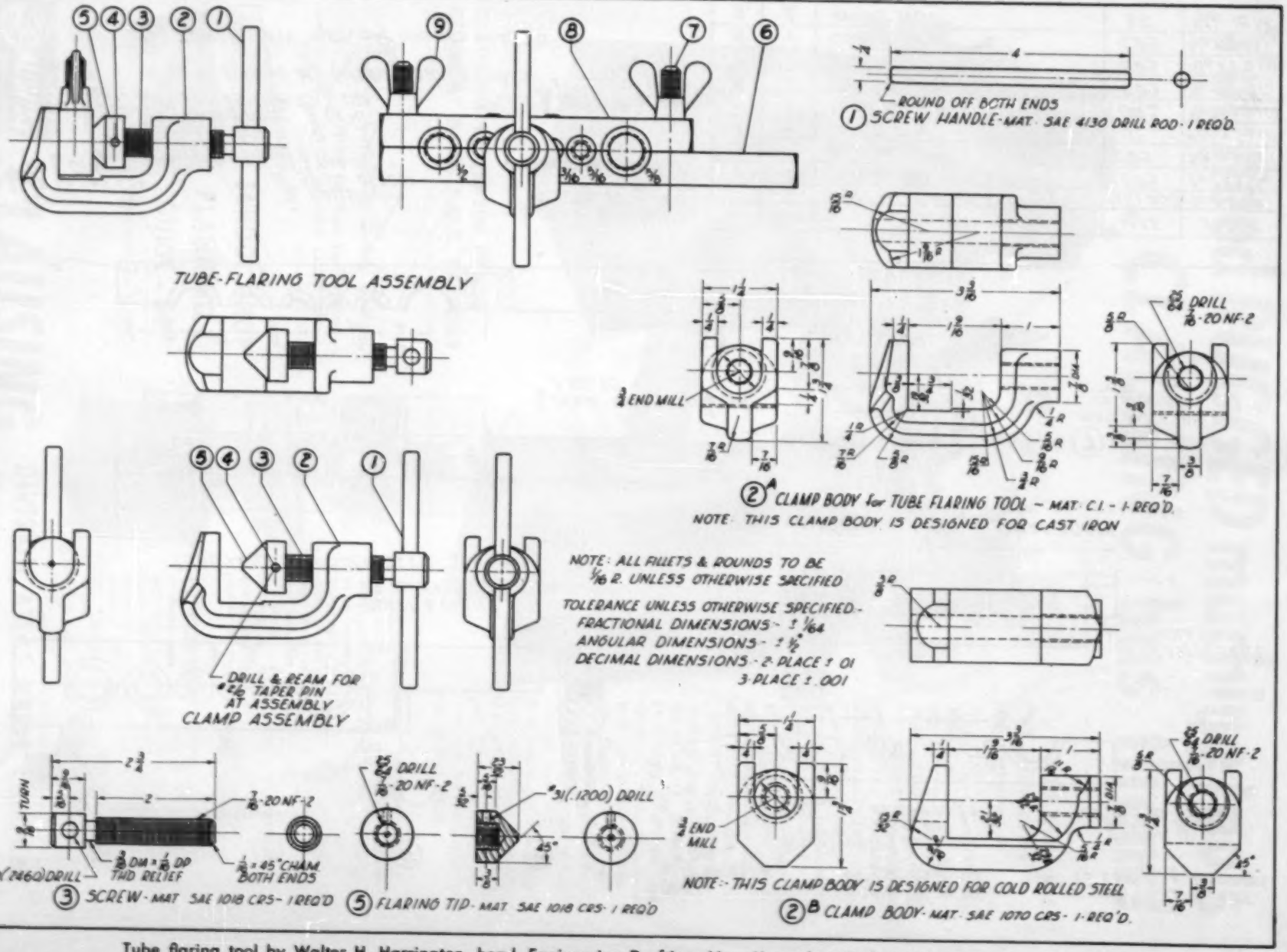
Format Comprising Plan Sheet

The plan sheet has been designed for the general shop laboratory but with minute changes, could be made adaptable to a unit or general unit laboratory. The front page of the plan sheet provides space for the heading which is basically for identification. It includes

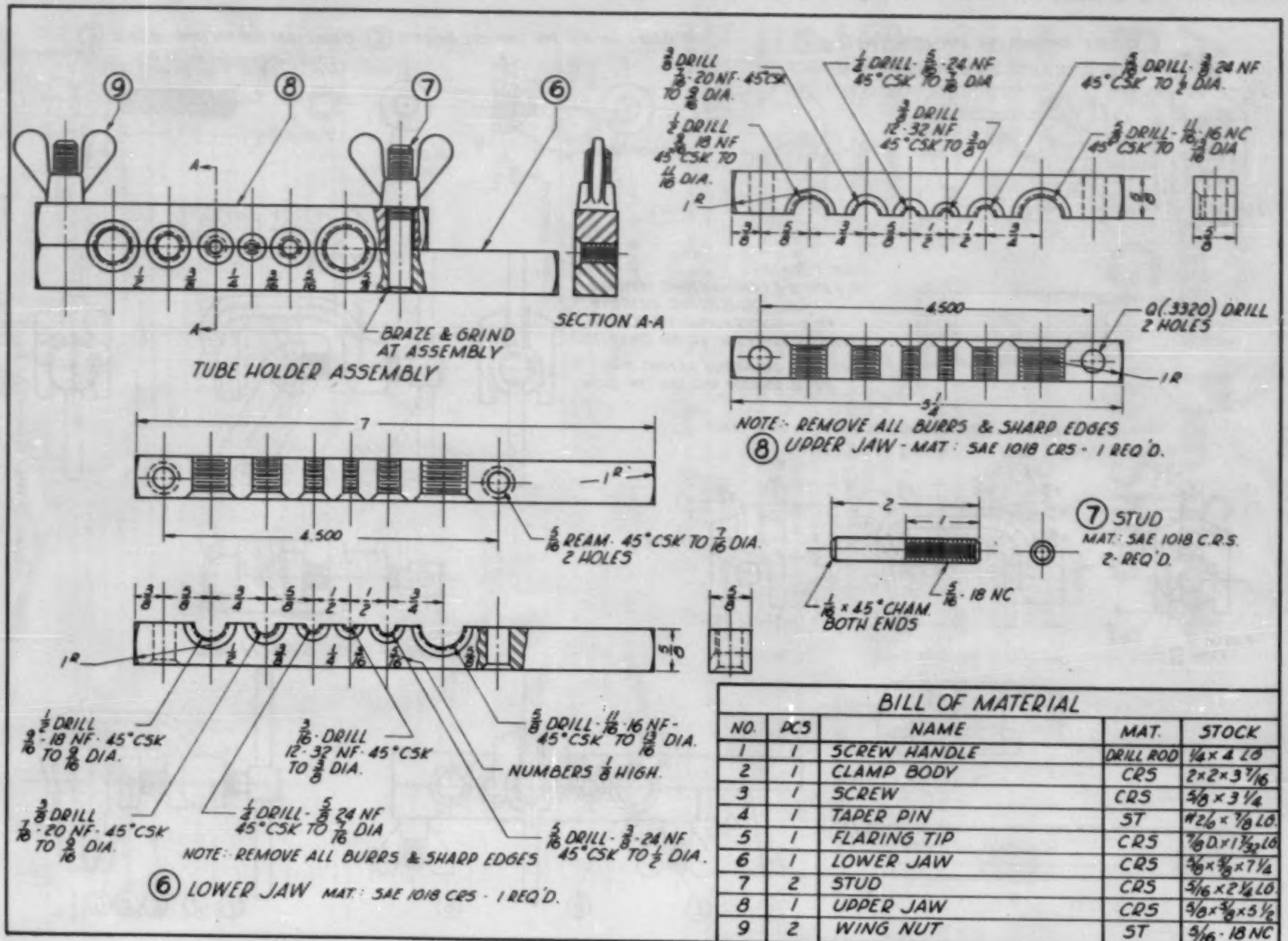
(Continued on page 16A)


PLAN SHEET
DEPARTMENT OF INDUSTRIAL ARTS
NAME _____ COURSE _____
PROJECT _____ DATE _____ TO _____
PICTORIAL SKETCH
APPROVED _____
WORKING DRAWING - A COMPLETE DRAWING IS TO BE MADE ON AUXILIARY SHEETS
BILL OF MATERIALS
PARTS | NO. PCS | KIND OF MATERIAL | SIZE T W L | UNITS | VALUE UNIT | VALUE COST | TOTAL COST
SOURCE AND REFERENCES PERTINENT TO THE PROJECT
1. _____
2. _____
STUDIES OF RELATED INFORMATION WILL INCREASE THE VALUE OF YOUR EXPERIENCE
PROCEDURE
LIST MAJOR STEPS IN CONSTRUCTING THIS PROJECT
AREAS OF INDUSTRY
TO BE EXPERIENCED - X ALREADY EXPERIENCED - E
WOODS
Hand Tools
Cabinet Work
Carpentry
Pattern Work
Upholstering
Power Tools
METALS
Art Metal
Sheet Metal
Cold Metal
Foundry
Forging
Welding
Spinning
Machining
CRAFTS
Ceramics
Textiles
Leather Craft
Plastics
Carving
Lapidary
ELECTRICITY
Apparatus
Motor
Automotive
Residential
Electronics
DRAFTING
Architectural
Mechanical
Pictorial
Design
GRAPHIC ARTS
Printing
Block Printing
Bookbinding
Silkscreening
Photography
Rubber Stamps
CONCRETE
Forms
Masonry
Construction
OTHERS
TOOLS AND MACHINES USED FOR FIRST TIME
PLANNING
STUDENT INSTRUCTOR KEY
Drawing
Procedure
Completeness
References
PROJECT
Relationship to Plan
Skills - Accuracy, Speed, etc.
Appearance
EVALUATION | PLAN | PROJECT
STUDENT
INSTRUCTOR
TOTAL HOURS

Front and reverse sides of the plan sheet


TUBE-FLARING TOOL ASSEMBLY
ROUND OFF BOTH ENDS
(1) SCREW HANDLE - MAT. SAE 4130 DRILL ROD - 1 REQ'D.
(2)A CLAMP BODY for TUBE FLARING TOOL - MAT. C.I. - 1 REQ'D.
NOTE: THIS CLAMP BODY IS DESIGNED FOR CAST IRON
NOTE: ALL FILLETS & ROUNDS TO BE 1/16 R. UNLESS OTHERWISE SPECIFIED
TOLERANCE UNLESS OTHERWISE SPECIFIED -
FRACTIONAL DIMENSIONS - ± 1/64
ANGULAR DIMENSIONS - ± ½°
DECIMAL DIMENSIONS - 2 PLACE ± .01
3 PLACE ± .001
DRILL & REAM FOR #2 TAPER PIN AT ASSEMBLY
CLAMP ASSEMBLY
(3) SCREW - MAT. SAE 1018 CRS - 1 REQ'D
(5) FLARING TIP - MAT. SAE 1018 CRS - 1 REQ'D
NOTE:- THIS CLAMP BODY IS DESIGNED FOR COLD ROLLED STEEL
(2)B CLAMP BODY - MAT. SAE 1010 CRS - 1 REQ'D.

Tube flaring tool by Walter H. Harrington, head, Engineering Drafting, New Hampshire Technical Institute, Manchester, N. H.


9
8
7
6
A
A
BRAZE & GRIND AT ASSEMBLY
SECTION A-A
TUBE HOLDER ASSEMBLY
3/8 DRILL 1/2-20 NF-45°CSK TO 3/8 DIA.
1/2 DRILL 3/8-18 NF 45°CSK TO 11/16 DIA.
1/4 DRILL-5/16-24 NF 45°CSK TO 7/16 DIA
3/8 DRILL 12-32 NF 45°CSK TO 3/8 DIA
5/8 DRILL-3/8-24 NF 45°CSK TO 1/2 DIA.
5/8 DRILL-11/16-16 NC 45°CSK TO 13/16 DIA
1R
4.500
Q(.3320) DRILL 2 HOLES
5 1/4
NOTE:- REMOVE ALL BURRS & SHARP EDGES
8 UPPER JAW - MAT: SAE 1018 CRS - 1 REQ'D.
7
4.500
5/16 REAM 45°CSK TO 7/16 DIA. 2 HOLES
2
1
7 STUD
MAT: SAE 1018 C.R.S.
2 REQ'D.
1/16 x 45° CHAM. BOTH ENDS
5/16-18 NC
1/2 DRILL 9/16-18 NF-45°CSK TO 9/16 DIA.
3/16 DRILL 12-32 NF-45°CSK TO 3/8 DIA.
5/8 DRILL-11/16-16 NF-45°CSK TO 13/16 DIA.
NUMBERS 1/8 HIGH.
3/8 DRILL 1/2-20 NF-45°CSK TO 9/16 DIA.
1/2 DRILL-5/8-24 NF 45°CSK TO 7/16 DIA
5/16 DRILL-3/8-24 NF 45°CSK TO 1/2 DIA.
NOTE:- REMOVE ALL BURRS & SHARP EDGES
6 LOWER JAW MAT: SAE 1018 CRS - 1 REQ'D.

BILL OF MATERIAL

NO.	PCS	NAME	MAT.	STOCK
1	1	SCREW HANDLE	DRILL ROD	1/4 x 4 LG
2	1	CLAMP BODY	CRS	2 x 2 x 3 5/16
3	1	SCREW	CRS	5/8 x 3 1/4
4	1	TAPER PIN	ST	#2 LG x 3/8 LG.
5	1	FLARING TIP	CRS	7/8 D. x 1 3/32 LG
6	1	LOWER JAW	CRS	5/8 x 3/8 x 7 1/4
7	2	STUD	CRS	5/16 x 2 1/4 LG.
8	1	UPPER JAW	CRS	5/8 x 3/8 x 5 1/2
9	2	WING NUT	ST	5/16-18 NC

Further details and the bill of material for constructing the tube flaring tool by Walter H. Harrington

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. . . and they set the standards for safety.

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And they have these important safety features: tapered key drive spindle nose . . . completely enclosed underneath drive . . . "safety" apron and quick-change control features . . . completely enclosed headstock, apron, quick-change box.

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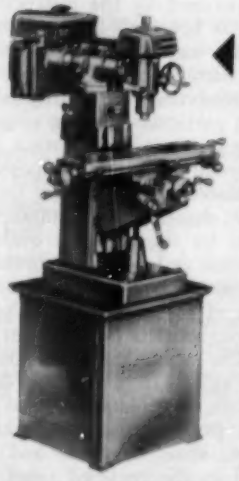
Safety Sam Says:
Write for free Safety Sam posters, and catalogs.

SCHOOL SHOP PLANNING GUIDE - 50¢
(65c outside U.S.A.)



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CLAUSING DIVISION, ATLAS PRESS COMPANY
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PLAN SHEET

(Continued from page 344)

space for the name of the student, the course, the title of the project and date commenced and completed.

The pictorial representation of the project gives the instructor the opportunity to observe and make recommendations. It provides the occasion for the student to apply his drafting skills and the instructor to emphasize the value of good design. If the pictorial drawing can be dimensioned adequately and still maintain the quality desired, the working drawing may be eliminated. It is preferable to include the working drawing in most situations. If the working drawing is placed on auxiliary sheets, it may be attached to the plan sheet. Space is provided for the signature of the instructor indicating his approval of the plan.

The bill of materials is arranged to accommodate almost any entry. Note the column asking for the name of the parts, this will eliminate leaving out parts of the project in the planning process. Furthermore, the bill of materials assists in figuring the cost of essentials and is helpful in gathering supplies to be used in construction of the project. It also provides practical application for the units of measure for the various materials that may be used. It is advisable to have the bill of materials completed before the work has begun on the project. The student, as the consumer, can study the economic and technical aspect of the plan with the instructor to see if satisfactory materials have been selected, design is adequate, and cost is feasible. Numerous problems can be solved, in a combined student-instructor conference, and others avoided through the guidance of the instructor because of his previous training, experience, and know-how.

The extent and use of related information will be determined by the grade level of the students. The use of related information can be helpful to the student in planning his project. The student will encounter additional operations and processes that will better acquaint the individual with the problems of industry. The plan sheet suggests the student list at least two of the references used in the planning of his project. These can be books, magazines, pamphlets, brochures, films, visual aids, or individuals who may have made contributions.

On the reverse side of the sheet will be found the list of procedures which is to encourage the student to analyze the construction of his project before work is commenced. If some of the processes are new, the student should be encouraged to study related information. By examining the procedures, the instructor can observe if the student is aware of the problems involved in construction of the project, and if demonstrations are needed and if certain basic skills are required. A list of the machines and tools to be used is, also, included in lower left hand corner. This requires the student to become familiar with the equipment before work is started. These two lists combined will help avoid mistakes in the actual construction and assembly, and promote acceptable safety practices.

This is followed by the section titled areas of industry. The listing of the major areas, for example, graphic arts, with activities in a column directly beneath, serves to illustrate to the student its prominence in our modern industrial society. By the same token, it exemplifies the importance of the industrial-arts training and assists in bridging school experience with industry. This makes industrial arts, as viewed by the student, more practical, functional, and realistic as related to our industrial society.

The marking of these areas, either by an X, indicating to be experienced, or O, already experienced, gives the instructor a résumé of the student's previous learning. It also indicates if the project will be a challenge to the student with regard to his ability and past experiences.

The plan sheet which accompanies this article has provided space for student-instructor evaluation. This is an attempt to accommodate for those numerous learning experiences, that take place during the construction of the project that are equally important as the finished project. Self-evaluation is an experience in itself and should be encouraged by the instructor.

The key used in the plan sheet is a rating scale ranging from one through ten with ten being superior. It is recommended that the individual adopt his own particular grading system which is best suited to the situation. In addition, information should be posted or made available to the student on a separate sheet describing the standards that are used by the class for evaluation. The student and instructor both have intermittent opportunities during the progress of the project to make evaluation throughout its development.

The evaluation can include the different aspects of planning as drawing, procedure, completeness, and references; the project comprises relationship to plan, skills involved, and appearance, and in the enclosed ruled box a final evaluation for the completed plan and project is provided.

At the extreme lower right hand corner space is available for recording the total number of hours needed to complete the project. This will assist the student to sense the value of time distribution.

Recommendations

The question that may be foremost in the reader's mind is, what results can be expected from such a plan sheet? The list of possibilities are numerous. The writers have chosen to enumerate a few for your consideration; with no particular preference as to order, they are as follows: (1) reduces the time required to check and evaluate the plan sheet and project when completed, (2) enables the student to assume the responsibility and to do most of the organizing and planning, which promotes creativeness and objective thinking, (3) acquaints the student with industry and its processes by use of related materials, (4) it is one approach in accomplishing the objectives of industrial arts, (5) serves to co-ordinate the student's laboratory experiences with the instructor for supervision purposes, and (6) a composite record of the student's experiences encountered is on one sheet, and (7) the plan sheet can be placed in a folder and filed with other plan sheets for counseling. In this way a profile of the student will be procured, during his industrial-arts training, showing his experiences, activities, skills, etc., acquired. This information with anecdotal notes can serve as a cumulative laboratory record for guidance purposes at a future date.

Conclusion

The remarks conveyed in this article were stated, so they might serve as the nucleus to stimulate the individual instructor who reads this to organize a plan sheet that best fits his needs. If sections of the plan sheet merit consideration, fine, adopt them, but better still, *jell* this thinking with ideas of your own in preparing a plan sheet that is pertinent to the industrial-arts program of your school.

Acknowledgment

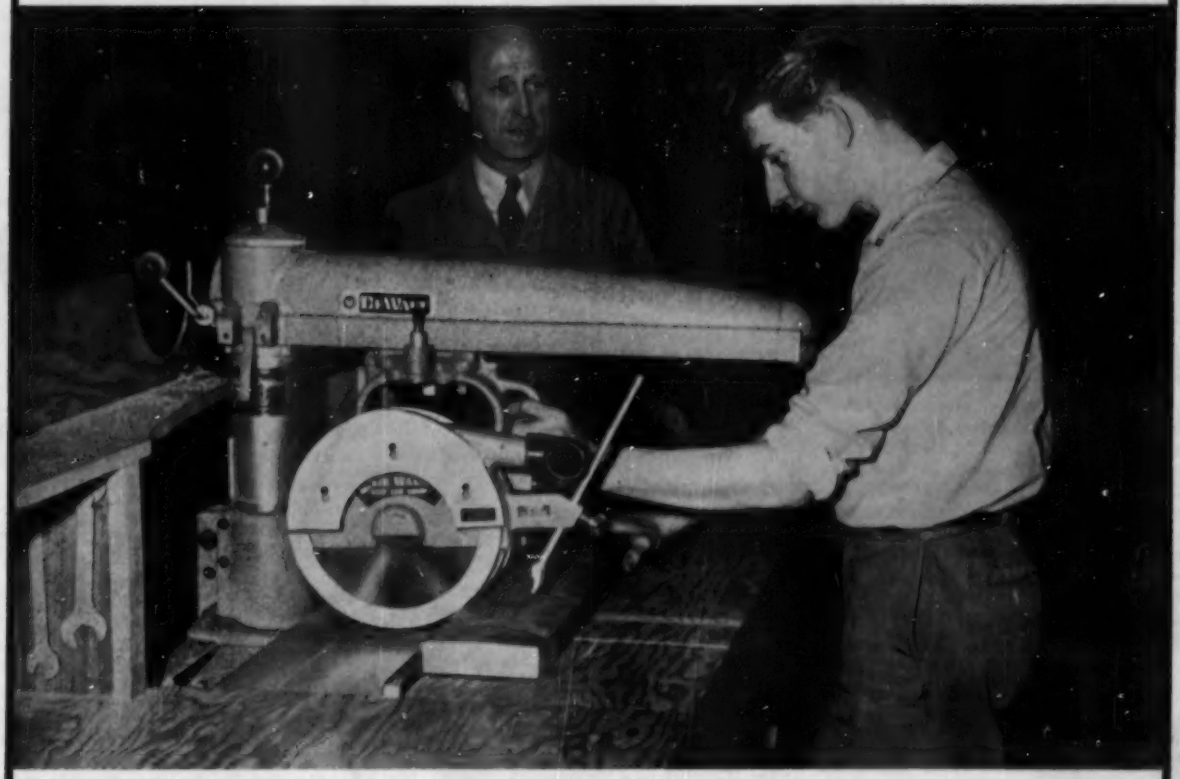
The plan sheet was set by hand composition by Charles J. Faust, Ball State Senior, using Copperplate Gothic and School Book Oldstyle type faces and printed by letter press on a Little Giant press. The copy was then reproduced by employing a 14 by 17 ATF process camera and printed by offset method using a Model 1250 Multilith press, by students, Thomas A. Mock, John K. Rapp, and Andy Sandala, in the graphic arts area at Ball State Teachers College.

BIBLIOGRAPHY

Allen, Willard A., "The Student Plan Sheet,"

(Continued on page 18A)

Future job safety is your responsibility...



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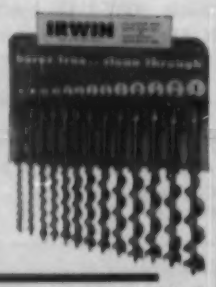
America's most popular School Shop set. 13 Irwin 62T hand brace type bits in hand-rubbed hardwood box, sizes ¼" to 1". Medium fast screw pitch makes the Irwin 62T ideal for all-purpose boring in most any wood. Double cutter action, solid center design, hardened full length for longer life. Each bit highly polished. Also available in individual sizes and plastic roll sets.

D-13 SCHOOL SHOP SPECIAL
Irwin storage rack and bit set. A convenient combination of 13 Irwin 62T wood auger bits and small space storage rack. Patented spring steel clips hold bits in place. Hole sizes make selection sure and easy. Steel rack fits 8" x 10¼" area and screws easily to wall or bench. Boring range of 13 bits, ⅛" to 1".



Write for Free Irwin Catalog No. 52. Makes ideal reference guide.

IRWIN Wilmington, Ohio
the original solid center auger bit
•
screw drivers
screw driver bits

PLAN SHEET

(Continued from page 16A)

Industrial Arts and Vocational Education, Nov., 1953.

Ericson, Emanuel E., *Teaching Problems in Industrial Arts* (Peoria, Ill.: The Manual Arts Press, 1930).

Mays, A. B., and Casberg, C. H., *School Shop Administration* (Milwaukee Wis.: The Bruce Publishing Co., 1943).

Struck, Theodore F., *Creative Thinking: Industrial Arts and Vocational Education* (New York: John Wiley and Sons, Inc., 1938).

Wilbur, Gordon O., *Industrial Arts in General Education* (Scranton, Pa.: International Textbook Co., 1948).

THINK MORE CLEARLY WITH AN ANALYSIS CHART

CARL G. BRUNER

Co-ordinator, Dept. of Industrial and Vocational Education

Wichita High School East

Wichita, Kans.

Today's methods and theories should be taught in our schools — not yesterday's. All of us who have taught a few years know how easy it is to get out-of-date. Under the strong stimulus of war and defense needs, science and industry have made enormous strides in the development of new methods, new materials, and new devices. A teacher becomes hopelessly inadequate if his course of study, his demonstration material, and his stock of illustrative anecdotes are not revised frequently. The material we present should be fresh and up-to-date. Our students should recognize our offering as abreast of the current scene. It is easy to forget that the memory, experience, and interest of a high school sophomore does not go back as far as ours. Anything older than ten or twelve years is ancient history to them. Future and past are relatively unimportant in their active lives. They live in the present. It takes a lively and vivid story of past achievements to compete successfully with the delightful present.

A Most Worthy Annual Task

A most worthy project each year is to analyze and evaluate each class activity to determine if it is still a part of the current scene — if it is still a proper representation of that phase of adult life for which the course is designed to train. Drifting along has no place in the modern, fast paced tempo of living. Yet all of us find it easy to drift unless we use a systematic method of checking ourselves and our courses of study. Unless we are too old or too lazy to want to achieve, most teachers welcome a device that will prod

a School Shop "must"
HOSSFELD
UNIVERSAL® IRON BENDER
Bends Flats, Rounds, Bar, Angle & Pipe

Model #1 — WRENCHLESS TYPE

SAMPLES OF BAR BENDING

Simulate in the shop the 101 different bending jobs your students will be called on to perform in repair, maintenance and production work. Teach them to make neat, quick and accurate round or square cold bends on pipe, conduit and ornamental iron work. Make them proficient in forming "U" bends, eye bolts, angle iron, automobile springs eyes, heavy bends, sharp square and 90° bends, and a host of others. The Hossfeld Bender has been proved over the years in metal-working, welding and repair shops. It replaces special machinery, and is as practical and indispensable as a shop vise.

GET THE FACTS!
Write today for bulletin giving operating instructions, specifications and capacities of the models available, and die and parts list.

HOSSFELD
MFG. CO.
438 W. 3rd Street
Winona, Minnesota

them into renewed constructive activity.

Analysis charts, in their many forms are valuable devices to clear the thinking of the teacher, the student, or the visitor. No instruction aid has been developed that will cause the teacher to do a better job of selecting realistic objectives and concrete goals. Probably every shop class should have a chart showing the entire educational offering in a particular field posted on the wall for all to see. Not only will the teacher's concept of his task grow in clarity, but the chart will serve as a visual aid in explaining the scope and purpose of the course to students, parents, the visiting taxpayer, and the members of the advisory committee.

Students work best and learn fastest when they feel the need for the work. It is much better to let them discover that the fact, or skill, or method is necessary and important, than to try to tell them that they will need the material they are working on some day. If they can see on the chart that the whole proposition fits together and makes sense, they don't have to be *sold* on the value of the lesson.

To restate the point — a good chart will show all interested parties that the teacher has thought his problem through. It will clarify for the student the relationship of the work that he is doing with the whole educational plan. It will serve as an excellent focal point for profitable discussions with visitors, whether they are school officials, interested businessmen, or parents. It will pinpoint the objectives of the course for all concerned. And, if the chart is developed with the co-operation of representatives of business and industry, it becomes *their baby* and tends to improve the public relations and support of the school.

Such a chart is capable of infinite variations. Each teacher, in developing his own chart should give full rein to his ideas of how best to show what is being done in his classes. Design a chart that will show clearly the goals of the work. Make these goals clear, concise, and definite. Avoid generalities. Don't claim results for your course that cannot be proved by suitable tests, or examinations, or other objective studies.

Preparing the Chart

Briefly stated, the steps in preparing a chart are as follows:

1. List the major goals of the course.
2. Break down the major goals into definitely stated objectives.
3. List down the side of the chart the activities or lessons you plan to use to cause each student to learn the desired material.
4. Check which objectives are covered by each activity.

(Continued on next page)

3 new precision tools that take the "task" out of precision

New Tri-Cal Universal Vernier Caliper
A tool of three-fold utility! Takes outside, inside, or depth measurements directly and positively to thousandths of an inch. Extra-long vernier plate makes reading easier . . . knurled pusher knob facilitates setting. Stainless steel, with hardened edges and jaws.

New Black Frame Micrometer
0 to 1 inch range by ten-thousandths of an inch. Large thimble, black graduations and figures with wide divisions are easily read. Exclusive stainless steel spindle and screw. Also available in thousandths of an inch.

New Chrome Finish Steel Rules
Rust and stain resistant rules in 6" and 12" lengths. Dull chrome finish eliminates all glare . . . figures and graduations are easy to read at any angle — in any light.

Your students will make more accurate measurements with far less effort and fatigue using these three new Brown & Sharpe Precision Tools. Every figure and graduation is clear-cut, easy to read . . . every adjustment smooth and simple. Their positive-precision design inspires confidence . . . develops speed and accuracy faster. And their top quality assures lasting service . . . through apprenticeship and on the job. Write for full details on these and other new tools. And for information on the complete Brown & Sharpe Precision Tool Line, send for Catalog 135. Brown & Sharpe Mfg. Co., Providence, Rhode Island.

BUY THROUGH YOUR LOCAL DISTRIBUTOR

Brown & Sharpe B·S

ANALYSIS CHART

(Continued from previous page)

Other teachers like to place all of the material in the heading, list the student's names down the side of the chart, and place a date in the proper square to show the student's progress. A record card may be used with such a chart to keep a record of each student's accomplishment.

It is not necessary to have a complete chart before you can begin its use. Get a large piece of plywood. Letter the various items on bits of card and fasten them in place with thumbtacks or with a stapler. Change them around from time to time as your thinking is modified by conferences with others and by experience with the students. You will be pleased with the chart as it grows. And, you will be pleased with your own clearer view of your work.

After you get your chart started, use it. Discuss your plans with everyone who will listen. Never take it for granted that they already know. The telling of the story of what the school is doing is a task that is never completed. Each day additional thousands of young people become of age. Each day additional children are being born which means that each day young parents are becoming interested in the educational opportunities available in the community for their children. More closely related to our work is the fact that each day additional young men are reaching the age when they must begin to train themselves so that they can take their place as competent citizens. There is always a fresh audience to whom the story of what you are doing should be told. A good wall chart retains the interest and illustrates the story.

Summary

A good analysis chart will help you teach, will help keep you up-to-date, will help you arrive in your own thinking at sound goals and objectives, will help you explain your course to parents and other visitors, will help you keep the respect of your administrators, and the development of such a chart will give you a reason for inviting in the businessmen and industrial leaders whose help and support is essential if you are to succeed.

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CHICAGO U.S.A.

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4244 North Knox Ave., Chicago 41, Ill.
Gentlemen: Please add my name to your Shop Instructors mailing list.
Name ☐ School ☐ Home
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Street Address Zone State
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PLEASE SEND ME YOUR NEW CATALOGS DESCRIBING
☐ 10" ☐ 11" ☐ 13" Sheldon Lathes
☐ 13" ☐ 15" Sebastian Geared Head Lathes
☐ Horizontal Milling Machine ☐ 12" Shaper

Better Machine Tools for Teaching
. . . safer to operate, easy to learn on

For every school shop, laboratory and classroom . . . (from beginning classes in industrial arts and vocational education through advanced courses in trade schools and universities) . . . Sheldon builds a lathe to fit each academic, space and budget requirement.

Sheldon lathes are modern in design. With their easy-to-operate controls, students can learn basic lathe operations quickly and rapidly advance to practical shop projects.

From the largest 15" swing geared head lathe to the smallest 10" swing bench lathe, every Sheldon-built lathe meets the same rigid standards . . . standards that insure long life with minimum maintenance requirements in your school shop.

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13" Swing
Precision Lathe

No. L-46 Sheldon
10" Precision Lathe

Sheldon-Built
Sebastian 13" and 15" Geared Head
Precision Lathes

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Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.
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ASSOCIATION NEWS

(Continued from page 8A)

Place in Do-It-Yourself Programs With Special Reference to Safety?"

Chairman: J. E. TePoorten, Co-ordinator, Wisconsin Schools of Vocational and Adult Education, Madison, Wis.

"General Introduction to Do-It-Yourself Activities": Nicholas P. Stumpf, Maine Township High School, Des Plaines, Ill.

"In Homemaking Programs": Rena L. Hodgen, Chief, Homemaking Education, Department of Education, Springfield, Ill.

"In Farm Shop Programs": Harold Homann, Du Quoin High School, Du Quoin, Ill.

"In the Hobby Program": John M. Groebli, Professor of Industrial Arts, Santa Barbara State College, Santa Barbara, Calif.

"In the Home Projects for Profit Program": Kermit A. Seefield, Chairman, Industrial Arts Department, University of California, Santa Barbara, Calif.

COUNCIL AWARDS HONORARY MEMBERSHIPS

The American Council on Industrial Arts Teacher Education awarded three honorary memberships at the Milwaukee convention. These awards, the first to be made by the Council, were presented to Professor E. E. Ericson of the University of California at Santa Barbara; Dr. DeWitt Hunt, Industrial Arts Specialist, in the United States Office of Education; and Professor Milo T. Oakland, chairman of the Department of Industrial Arts Education at Northern Illinois State Teachers College. All three retired this summer.

NEW OFFICERS ELECTED

The new officers elected for the next two-year term of the American Council on Industrial Arts Teacher Education are Dr. R. Lee Hornbake as president, and Dr. Elroy W. Bollinger as secretary.

Dr. Hornbake is chairman of the depart-

(Continued on page 22A)

STANLEY SHOP TALK

SURFORM
No. 296 — Plane type

New! "SURFORM"®
for surface forming

A new concept in cutting tools that will be popular in your school shop. ***SURFORM'S*** 450 cutting edges make quick work of cutting wood, wood or fibre composition boards, plastics, soft metals, etc. Fast as a flash for fitting, trimming, smoothing and shaving. Each cutting edge has its own throat through which cuttings pass . . . no clogging. Die cast aluminum bodies and black hardwood handles. ***SURFORM*** is available in file type (No. 295) and in plane type (No. 296). Both tools use the same replaceable Sheffield Steel Blade.

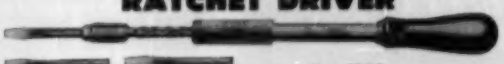
SURFORM
No. 295 — File type

"Boy-Proof"
WOOD CHISELS

Stanley Nos. 40 and 50 — Sturdy *"Boy-Proof"* Tools for trouble-free performance in school shops. One-piece alloy steel blade and shank extend almost through the handle. Tough plastic handle assembled to blade — will not come loose. Steel cap on handle transmits hammer blow directly to cutting edge of blade. Blade has excellent and uniform cutting qualities. Both chisels made in complete range of sizes.

No. 40 No. 50

"YANKEE"® SPIRAL RATCHET DRIVER



No. 130A

The *"Yankee"* No. 130A with quick-return spring in handle. Saves time and muscle. Supplied with three sizes of bits. "Yankee" Spirals available in three sizes, two styles. To convert this versatile tool for other jobs, buy accessories listed here.

Bits, Drill Points, Countersink. Accessories available for "Yankee" No. 130A: Nos. 301, 302 and 303 — Phillips bits in three sizes. No. 309 — Adapter and 8 drill points. No. 3030 — Countersink.

¾ HP ROUTER

A versatile woodworking tool. Shapes edges, grooves, rabbets, mortises, inlays and templet cuts. Many woodworking jobs are easily and effectively accomplished with this multi-purpose tool. The speed of 20,000 RPM produces a surface where little sanding is necessary.

R8A

DOVETAIL FIXTURE

The Stanley No. 61. Used with the R8A router, this fixture adds cabinetmaker skill to school shop woodworking. Both front and side piece for drawer fronts are dovetailed in one operation. Joints easily cut with very simple setting details.

ORDER STANLEY TOOLS FROM YOUR DISTRIBUTOR.

Use this coupon for more detailed information and school shop help.

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NAME_____

SUBJECT YOU TEACH or POSITION_____

SCHOOL_____

CITY_____ ZONE____ STATE_____

ASSOCIATION NEWS

(Continued from page 20A)

ment of industrial education at the University of Maryland. He was formely vice-president of the Council.

Dr. Bollinger is with the Bureau of Industrial Teacher Training for the State Education Department of New York. Both men are long-time contributors to the profession of industrial arts.

Drs. John A. Fuzak and Ivan Hostetler will continue as vice-president and treasurer respectively for the Council for the coming year.

The spring, 1957, convention of the Indiana Industrial Education Association will be held in the Oliver Hotel, South Bend, Ind., on April 4, 5, and 6.—*Floyd M. Dickey, president.*

♦ The 1957 Annual Convention of the California Industrial Education Association will be held in San Jose, Calif., April 5 and 6, 1957.

Personal News

DR. HOMER J. SMITH

Dr. Homer J. Smith, who recently completed a tour as an exchange professor in Pakistan, is joining the industrial education staff at Southern Illinois University. Dr. Smith is an emeritus professor at the University of Minnesota, having served this institution since 1912. He attained emeritus rank in 1954. At Southern Illinois University, he will assist in the development of an extended graduate program in industrial education. He will be teaching graduate courses and lecturing in the field of vocational and industrial education.

Dr. Homer J. Smith

Dr. Smith has had wide experience in the field of education and has had many contacts in the field of industrial, guidance, adult, and elementary education. He has served on the educational advisory board of the American Technical Society. In 1944, he was awarded the "Ship's" Citation for National Leadership in industrial education by the A.V.A. He is the author of several books and bulletins, and has been an outstanding contributor to educational journals. He will be a great asset to the program at Southern Illinois University, Carbondale, Ill.

DR. HENRY H. MORRIS

Dr. Henry H. Morris, head of civil engineering at Southern Louisiana Institute, has recently been appointed professor of applied science at the Southern Illinois University. Dr. Morris received the B.S.C.E. degree from Rice Institute in 1939. From the University of Minnesota he received the M.S.C.E. in 1948 and the Ph.D. in 1950.

For several years, Morris was connected with the International Boundary Commission, and some time before he worked with the Texas Highway Department. He has held teaching positions at the Rice Institute and the University of Minnesota. He has published several research papers dealing with hydraulics; he has contributed to the engineering periodicals. The title of his Ph.D. dissertation was "A New Concept of Flow in Rough Conduits," University of Minnesota, 1950, 151 pp.

NORTH TEXAS STATE COLLEGE

Dr. Charles A. Bunten and Dr. James H. Mahoney joined the industrial arts staff of North Texas State College, Denton, Tex., this year.

Dr. Bunten received his bachelor's degree from Eastern Illinois State College, the master's degree from Bradley University, and the Ed.D. from the University of Missouri. He has taught in the Illinois public schools, and the last year was on the industrial education staff at Ball State Teachers College, Muncie, Ind.

Dr. Mahoney has his bachelor's degree from Northeast Missouri State Teachers College and both the master's degree and Ed.D. from the University of Missouri. He has eighteen years' teaching experience in the public schools of Missouri.

(Continued on page 24A)

LW
America's Largest Builders of
DIVIDING HEADS

Accurate, Heavy Duty

Ball bearing thrust on worm shaft and rear end of spindle. Headstock spindle has threaded nose. Large tapered bearing adjustable for end play. Head tilts past 90°. Worm wheel and alloy stress-proof steel worm cut to close limits for accuracy. Complete with three index plates for dividing all numbers to 50 and even numbers to 100 except 96T. Index chart shows all divisions obtainable to 380. Specify left (illustrated) or right hand model.

MODEL SD
6½" Swing. Spindle threaded 1½"-8. ⅝" table slot tongues. 36 lbs.
$160.00

MODEL BP
11" Swing for plain milling machine. Spindle threaded 2¼"-10. ⅝" table slot tongues. 140 lbs.
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MODEL AU
11" Swing. Fully universal for complete indexing and spiral cutting. Spindle threaded 2¼"-10. ⅝" table slot tongues. 190 lbs.
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* See your dealer or order direct, giving dealer's name.

Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products

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69 South St. Clair Street
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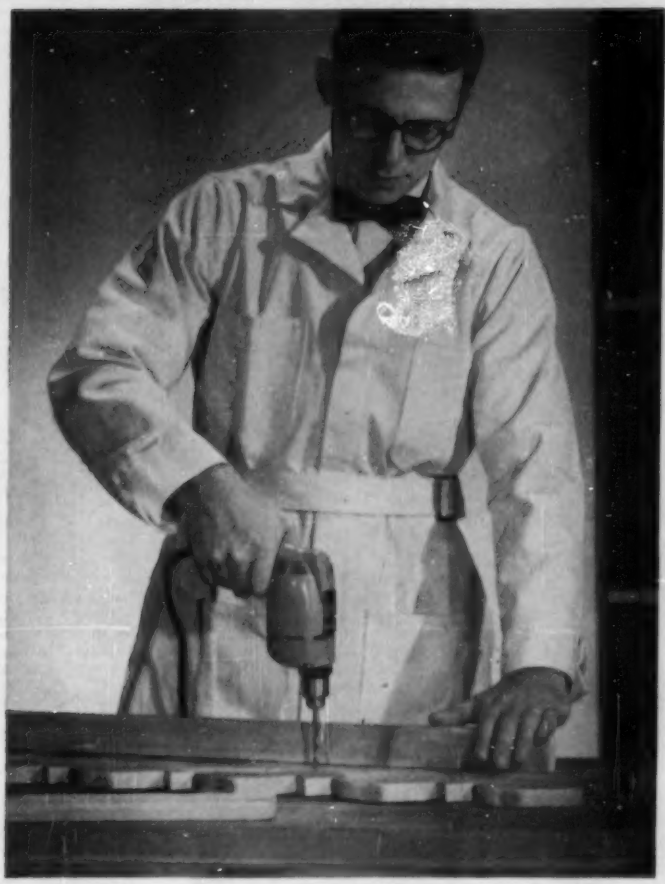
Up to 40% More Powerful

Than Other Drills in its Price Range!



NEW

SKIL ¼" DRILL

Meets Rugged Requirements of Either Training Work or School Maintenance!

Only SKIL offers a ¼" drill value like this! Besides 40% greater power (more than enough for toughest training shop and school maintenance jobs), Model 134 is ruggedly built for hard, daily student use. New light weight and pistol-grip design make it a smooth performer on hard-to-reach assignments. Drills with speed and accuracy through metal and wood.

Put the new SKIL Model 134 to work in your shop, at the low price of only $34.50! See it, try it, today!

ADVANTAGES YOU'LL FIND ONLY IN A SKIL DRILL AT THIS LOW PRICE!

- **New dura-plastic finish** for easier, more positive grip. Tough, chip-resistant, stays clean longer.
- **Quality geared chuck** for fast, accurate bit changing. Remains accurate throughout life of drill.
- **Ball bearing spindle** for longer service, greater precision. Peak performance through constant, rugged use.
- **Comfortable pistol-grip handle** makes work easier, reduces fatigue. Easy handling in close quarters.
- **Large inspection plate** for easy routine maintenance. Other famous SKIL Drill features!

SKIL STANDARD-DUTY ¼" DRILL, MODEL 134

ONLY $34.50

- Standard speed—1800 r.p.m.
- Capacity in steel, ¼"; in wood, ½"
- Net weight, only 3¼ lbs.

SKIL PORTABLE TOOLS

See Your Distributor For Complete Information on Model 134 Drill, or Call Your Nearby SKIL Factory Branch. The complete line of SKIL Power Tools includes saws, planes, drivers, belt sanders, disc sanders, portable and bench grinders.

Made only by SKIL Corporation, formerly SKILSAW, Inc.
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Factory Branches in ALL Leading Cities

PERSONAL NEWS

(Continued from page 22A)

Homer E. Money has returned to the industrial arts staff of North Texas State College after a two-year leave of absence, during which time he attended the graduate school at the University of Missouri and received the Ed.D. degree in June, 1956.

Other members of the industrial arts staff include: Dr. Earle B. Blanton, C. C. Davis, David W. Duncan, Jerry C. McCain, Pat N. McLeod, Dr. A. Frank Nelson, Fritz D. Roberson, and Leslie E. Sorrels.

Dr. Earl B. Blanton has been appointed director of the department. He holds the Ed.D. from Oklahoma Agriculture and Mechanical College. He succeeded Dr. S. A. Blackburn, who retired in 1955 after thirty-seven years with North Texas State College, the last twenty as the director of the department.

MR. YOUNG RECEIVES APPOINTMENT

Leonard J. Young has recently begun his duties as a member of the division in the Vocational Training Section with the International Labour Organization at Geneva, Switzerland.

During the school year 1955-56 Mr. Young was enrolled for graduate studies leading toward the doctoral degree at the University of Minnesota, and was attached to the industrial education staff as a teaching assistant. Prior to 1955 he was employed in the state of Florida at the A. & M. University, Tallahassee, serving as Associate Professor of Industrial Education, and also with the State Department of Education as itinerant trade and industrial teacher trainer.

DOCTORAL DISSERTATIONS COMPLETED

The doctoral dissertations have been completed in 1956, and doctor's degrees in industrial education were granted at the University of Missouri, Columbia, Mo., to the following men:

Chester B. Ainsworth, Associate Professor of Industrial Education, East Texas State College, Commerce, Tex. *Relation of Industrial Arts Instruction to Practices Followed by Adults in the Selection, Care and Use of Tools.*

Raymond C. Doane, Curriculum Specialist in Industrial Arts, St. Paul Public Schools, St. Paul, Minn. *Industrial Education in Selected State Schools for the Deaf.*

E. Max Eddy, Assistant Professor of Industrial Education, Purdue University, Lafayette, Ind. *General Related Instruction Needed by Students in Cooperative Occupational Training.*

Vincent R. Faulds, head, Department of Industrial Education, Arkansas Polytechnic College, Russellville, Ark. *Technical Training Needs of Selected Arkansas Industries.*

Richard E. Fisher, chairman, Department of Industrial Education, Pacific Union College, Angwin, Calif. *Status of and Need for Terminal Vocational-Technical Curricula in Senior Colleges and Universities.*

Robert G. Hammond, Associate Professor of Industrial Education, Northwestern State College, Natchitoches, La. *Evolving Concepts of Industrial Education in the Thinking of the Industrial Educator.*

John L. Johnston, Associate Professor of Industrial Arts, Illinois State Normal University, Normal, Ill. *Teacher-Demonstrations Versus Shop Activities in the Teaching of Electricity: An Experimental Comparison.*

James H. Mahoney, Assistant Professor of Industrial Arts, North Texas State College, Denton, Tex. *State Instructional Materials in Industrial Arts: Their Status, Content, Preparation and Use.*

Homer E. Money, Associate Professor of Industrial Arts, North Texas State College, Denton, Tex. *Practices and Opinions of Texas School Administrators Concerning Federally Reimbursed Vocational Education.*

William E. Mortimer, head, Department of Industrial Education, Utah State Agricultural College, Logan, Utah. *Attitudes of Educators and Students in Utah Toward Manual Labor and Manual Workers.*

Robert E. Sonderman, Assistant Professor of Industrial Arts, Eastern Illinois State College, Charleston, Ill. *Origin, Development, and Outcomes of Driver Education in Missouri.*

MR. GILBERT TO DeKALB

Dr. Harold G. Gilbert, formerly on the staff of the New York State College for Teachers at Oswego, has become Professor of Industrial Arts at Northern Illinois State College, DeKalb, Ill.

Professor Gilbert is a native of Buffalo, with undergraduate preparation at the New York State College for Teachers at Buffalo. After a period of military service with the army engineers, and occupation duty in Korea, he entered graduate work at The Ohio State University, completing the master's degree in 1947, and the doctorate in December, 1955.

HUGH NORRIS RETIRES

Hugh Norris, who directed the industrial arts program at East Central State College, Ada, Okla., for the past 37 years, retired from his position at the close of the spring semester 1956.

Mr. Norris received his B.S. degree from Pittsburg State Teachers College, Pittsburg, Kans., his A.B. degree from East Central State College, Ada, Okla., and his M.S. degree from Teachers College, Columbia University.

(Continued on page 26A)

C&P NEW SERIES PRESSES These presses in sizes of 8x12, 10x15, 12x18 and 14½x22, provide the student with equipment that furnishes all practical requirements of hand fed press operation. May be equipped with flywheel, belt and platen guards. Also furnished for treadle operation instead of motor drive.

CHANDLER & PRICE
PRESSES and PAPER CUTTERS

C&P BENCH CUTTER An efficient, small size cutter that handles sheets up to 19"x24". Equipped with two-handed safety control.

The Standard for Printing Education

C & P presses and paper cutters have been standard equipment in commercial plants and schools for over 50 years. So, the selection of C & P equipment for printing classes places before the students *practical* equipment exactly as used in commercial practice in the entire printing industry.

In addition, special safety features are incorporated, when desired, in C & P presses and paper cutters so that all safety requirements are fully satisfied.

For practical instruction—for safety in use—the foresighted administrator recommends . . . Chandler & Price.

C&P PILOT PRESS A thoroughly efficient little press, chase 6½x10, that teaches basic principles of press operation with exceptionally fine printing results.

***"HANDBOOK OF PLATEN PRESSWORK"** is one of the outstanding aids to printing furnished without charge to printing instructors. If you do not have a copy, just request one.*

THE CHANDLER & PRICE COMPANY

6000 CARNEGIE AVENUE • CLEVELAND 3, OHIO

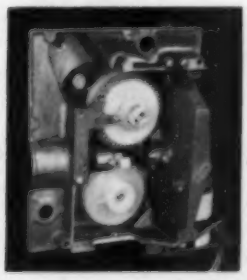
Here's the only lubrication record you need to keep with a **lifetime lubricated** Kodascope Pageant Projector

Why bother with lubrication "logs"? You'll *never* have to oil a Kodascope Pageant Projector!

Audio-visual experts say improper oiling is the most common cause of sound projector breakdowns. To protect you against costly repairs, lost time, and frequent maintenance checkups, every Kodascope Pageant 16mm Sound Projector is *permanently lubricated at the factory.*

No matter how many people use your Pageant Projector, no matter where they take it for showings, you are assured that this valuable *built-in* maintenance and protection goes along.

Prelubrication means low maintenance costs, means surer, quieter operation, too—throughout the lengthened lifetime of your Pagent Projector. Can you afford to be without it?



Nylon gears, oil-impregnated bearings, sealed ball bearings, and oil-retaining pads eliminate permanently any need to oil a Pageant Projector. Because of this design, stock machines in independent tests have run more than 1,000 hours without stoppage—equal to approximately 2½ years of normal use.

AND the Pageant also gives you:

1. **Smooth setups**—Reel arms fold easily into place; film path is printed on projector; drive belts are attached.
2. **Sparkling pictures**—Kodak's unique Super-40 Shutter automatically puts 40% more light on your screen at sound speed than do standard shutters.
3. **Natural sounds**—Tone and volume controls team with well-baffled speaker, fidelity control, and true-rated amplifier for clear, comfortable, natural sound.
4. **Choice of three models**—A 7-watt and two 15-watt models (8- or 12-inch speaker) with separate bass and treble controls, plus individually controlled microphone and phonograph inputs.

Before you choose any projector, get all the facts about the new model Kodascope Pageant Sound Projector. Send for this free booklet. There's no obligation.

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Dept. B-V Rochester 4, N. Y.

Please send me complete information on the new Kodascope PAGEANT 16mm Sound Projectors, and tell me who can give me a demonstration. I understand I am under no obligation.

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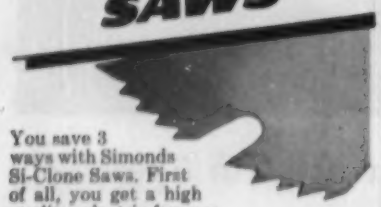
ORGANIZATION _____
STREET _____
CITY _____ STATE _____ (Zone)

Kodak TRADE MARK

Cut Your Saw Blade Bill with SIMONDS SI-CLONE SAWS



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What's more, you have a choice of 13 types of saws up to 12" diameter for specific cutting needs, for use on all standard table, radial arm or portable electric hand saw machines.

Get these money-saving saw blades from your hardware or mill supply dealer . . . send for Catalog "B".

Factory branches in Boston, Chicago, San Francisco and Portland, Oregon. Canadian Factory in Montreal, Que.

PERSONAL NEWS

(Continued from page 24A)

Before entering schoolwork he served an apprenticeship as a millwright.

In his first five years of teaching he served as director of industrial arts work at McKinney, Tex., High School; at the city school in Sherman, Tex., at the city school, Emporia, Kans., and at the city school, Tulsa, Okla.

Thirty-seven years ago he came to East Central State College as director of industrial arts. In this time the College has grown from one building to twelve brick and stone buildings; one man in industrial-arts department to four full-time faculty members; and from two students in the department to over 375 at the present time.

Mr. Norris has memberships in the American Industrial Arts Association, the Oklahoma Industrial Association and the Oklahoma Education Association, the National Association of Industrial Teacher Education, and National Education Association, and the Phi Delta Kappa, Educational Fraternity, Beta.

The community work to which he has contributed his efforts and time include Boy Scout work, Camp Fire Girls Organization, church work, past president of Chamber of Commerce, secretary and past president of the Kiwanis Club, city councilman for 4 years, mayor for 1 year, lodge activities, community and civic drives, and he was first secretary of the Industrial Arts Association in the state.

MR. TOBIA RECEIVES APPOINTMENT

Peter E. Tobia, who for the past three years was an industrial arts (general shop) teacher at the North Arlington Junior and Senior High School, Maywood, N. J., was recently appointed to the position of an arts and crafts education specialist with the United States Overseas Mission in Addis Ababa. The mission is an agency of the Department of State, and operated by the International Cooperation Administration.

The combined experiences of an industrial-arts teacher and an Army major who served in the Corps of Engineers will be used to advise the Ethiopian Ministry of Education in the development and administration of an arts and crafts program for the country schools.

Mr. Tobia entered the army in 1940 and was commissioned a Second Lieutenant at Fort Belvoir, Va., the Army's Engineer training school. He served in the Pacific area, most of the time as an on-the-job instructor with Engineer Construction Units.

He is a graduate of Newark State Teachers' College, where he received his B.S. degree in education. He also received the M.S. degree in administration and supervision in elementary education from the same institution.

In Addis Ababa, Mr. Tobia will help to plan a program to develop the skills of Ethiopian children with the tools at hand. It will be his task to work with the Ethiopians to learn how to improve their skills with native materials and raise their level of training.

♦ WAYNE S. RAMP, for the past nine years vocational machine shop instructor at the Streator Township High School, Streator, Ill., and also chairman of the industrial-arts department, is now employed by Bradley University. His present assignment is as a member of a seven-man team in Baghdad, Iraq. He is assistant director, metals specialist, and consultant in the Industrial Engineering Institute, Baghdad.

Mr. Ramp received his Ed.D. degree from Bradley University in June, 1956.

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News Notes

TRANSPORTATION CENTER OFFERS NATIONAL PROGRAM

The Transportation Center at Northwestern University, Evanston, Ill., launched its national program of research, education, and service, on October 5, 1956.

Organized specifically to meet the need for a fresh and integrated approach to transportation problems of steadily increasing complexity, the Center represents a new phase in industry-university co-operation. With substantial support from all segments of America's transportation system — railroads, airlines, ocean and inland waterway shipping lines, pipelines, and highway transport — the new Center will operate within the administrative framework of Northwestern.

Fred G. Gurley, chairman of the Center's Advisory Committee, and president of the Atchison, Topeka and Santa Fe Railway Company, has summed up the Center's meaning and potentials in this way:

"Northwestern is giving the transportation industry an opportunity to make a profitable investment — one that will pay us substantial dividends in the form of better-trained men for the transportation field, unbiased research on a scale no industry is equipped to carry on, and expert consultative services."

In addition to providing research and consultative services to the industry, the Center will offer undergraduate courses, studies at the graduate level leading to a master's degree, and special courses for personnel in the transportation field.

Director of the Center is Franklin M. Kreml, on leave from the internationally known Traffic Institute at Northwestern, which he founded. He has been working in close co-operation with the Center's 22-member Advisory Committee of transportation leaders in planning the basic services to be offered.

CALIFORNIA HEADS INDUSTRIAL ARTS AWARDS LIST WITH 128 CASH VICTORS

A total of 1371 student craftsmen from 43 states, Alaska, Canada, Puerto Rico, and District of Columbia won $50,000 in the 10th annual Ford Industrial Arts Awards international judging finals July 11th through the 13th in Dearborn, Michigan.

The more than 4300 entries in the final judging represented the finest of an estimated 40,000 projects. Some 955 schools were represented in the 1956 IAA final competition.

California, Pennsylvania, Ohio and Illinois were top states in number of cash award winners. The West Coast state also led the field with 253 winners, of which 128 were cash, seven were Outstanding Achievement Awards, four creative design awards, and 125 place winners.

Chicago again topped the list of major cities in number of winners with a total of 89. Philadelphia followed closely with 81 while Detroit had 60 and Los Angeles 52.

The District of Columbia had eight winners; Canada had seven and Puerto Rico, in her first year of active participation, had three.

EASTMAN CONDUCTS CONTEST

High school students will again have an opportunity to gain national recognition for themselves and their schools through the 12th Annual (1957) National High School Photographic Awards, as announced by Eastman Kodak Company. The competition has been placed on the approved list of national contests and activities for 1956-57 by the Na-

(Continued on next page)

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(Continued from previous page)

tional Association of Secondary-School Principals.

The new competition is open to students in daily attendance (grades 9–12) at any public, private, or parochial high school in the United States and its territories. There is no limit to the number of photos an entrant may submit. The primary qualifications are that the pictures must have been taken by the students themselves, since April 1, 1956, and that these same photos have not been previously entered in any national contests. Entries can be sent in between January 1 and March 31, 1957. Winners will be announced in May, 1957.

The contest recognizes achievement in photography with a total of $5,000 in prizes, and certification of merit. In addition, a selection of the winners will be made to form a traveling salon for use by schools upon request.

Full information about the awards and the traveling salon may be obtained from the *National High School Photographic Awards, 343 State St., Rochester 4, N. Y.*

EIGHT SENIORS SHARE PRIZES

Eight seniors from Rome, N. Y., high schools shared cash prizes totaling $1,300 after being selected as students showing the greatest degree of self-reliance in their school, home, and community life.

The prizes, four to boys and four to girls, were established by the Rome cable Foundation, Inc., created in 1952 by Rome Cable Corporation, manufacturer of wire, conduits, and cable.

The contest was administered by members of the Rome Junior Chamber of Commerce, and applications were received from Rome Free Academy, St. Aloysius Academy, the Academy of the Holy Names, and Vernon-Verona-Sherrill Central High School.

All seniors at the respective schools were eligible for the awards. Winners were selected on the basis of their scholastic records, work done in school and church organizations, work done for pay, resourcefulness with time and money, and character.

Winners of $300 first prizes were Michael Kowalchuk of Rome Free Academy and Mildred E. Miller of Vernon-Verona-Sherrill High School. Second place awards of $150 each went to Ross J. Tuzzolini of St. Aloysius Academy and Susanne Law of Vernon-Verona-Sherrill High School. Winners of $100 third prizes were Norman W. Haight of the high school and Dorothy Ann Koons of St. Aloysius Academy. Navella L. Van Duser and Paul E. Eichorn won the special $100 awards at the School for the Deaf.

GOODRICH HIGHER EDUCATION PROGRAM

Forms are available to B. F. Goodrich employees planning to participate in the Tuition Sharing or Gift Matching features of the B. F. Goodrich Aid to Higher Education program.

This program offers financial assistance to employees interested in additional education to improve present job performance or to prepare for opportunities with B. F. Goodrich which will exist in the future.

Regular employees actively employed on a full-time basis are eligible. Courses of study must be at college or graduate level in subjects related to the employee's present job or in fields which might aid him in future activity with the company.

In addition to the company's paying employees 50 per cent of the cost of tuition and laboratory fees, The B. F. Goodrich Fund, Inc., will pay direct to the school in which employees have completed the approved course or courses an equal amount.

TILE COUNCIL SCHOLARSHIP PROGRAM

A new scholastic-aid program for talented and deserving architectural students has been announced by the Tile Council of America, Inc., an association of manufacturers who produce 90 per cent of the domestic floor and wall ceramic tile.

The program, which is a pioneering effort in the academic field by building material manufacturers, was worked out with the advice of Frank Piskor, dean of men, Syracuse University, and Prof. D. Kenneth Sargent, School of Architecture, Syracuse University. The plan will provide annual scholarship or student loans amounting to $500 for each participating school of architecture plus a grant of $250 for furthering instruction in building-materials courses.

The purpose of the Tile Council plan is to extend aid to talented and deserving students as well as to encourage high standards in the teaching of courses on building materials.

Further information may be obtained by writing to *Tile Council of America, Inc., 10 East 40th St., New York 16, N. Y.*

INDUSTRIAL RELATIONS SEMINAR

The New York State School of Industrial and Labor Relations at Cornell University offered an Industrial Relations Seminar for labor relations and personnel men beginning on October 28 to November 16. Three weeks' study was devoted to an examination of labor relations and employee relations problems.

Professor Vernon H. Jensen was program director.

The first week of the seminar program was

(Continued on page 30A)

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NEWS NOTES

(Continued from page 28A)

given to the general setting within which the industrial relations function has developed and to the institutional arrangements and procedures which are being utilized in this field. The second week of the seminar was devoted to labor-management issues, such as seniority, workers security, discipline, and production standards. During the final week public policy issues and the government's role in labor relations was examined.

The Industrial Relations Seminar is the first of its kind to be offered by the school. ILR will continue its customary four-week "Human Relations in Industry" seminar next February and April.

REORGANIZATION PLAN

The School of Business and Industry at Southern Illinois University, Carbondale, Ill., was recently reorganized. This reorganization included the establishment of a new division separately administered through the president's office.

The division although unnamed at the present time will include two major departments: The Departments of Industrial Education and Applied Science.

Industrial education will continue to train teachers on the undergraduate and graduate levels; it will continue to assist in the training of industrial supervisors; and it will continue to offer service courses to pre-engineering and applied science.

The Applied Science department will take over the pre-engineering program and work in unison with the Industrial Education department to develop industrial supervisory and applied science programs.

Ralph O. Gallington, former Professor of Industrial Arts at Pennsylvania State University, has been named Chairman of the Industrial Education department and Acting Chairman of Applied Science.

AWARD IN ENGINEERING EDUCATION

A major new award in engineering education, to recognize the research potential and accomplishment of young workers engaged in engineering research in a college or university, will be given for the first time in June, 1957.

The Engineering College Research Council of the American Society for Engineering Education recently announced plans for the Curtis W. McGraw Research Award, established in memory of the late Curtis W. McGraw, president of the McGraw-Hill Publishing Company from February, 1950, to September, 1953, and brother of the present president, Donald C. McGraw. The award, sponsored by the McGraw-Hill Book Company, will include a cash prize of $1,000 and will be given annually beginning next June.

Candidates are to be young men "who have made original contribution in engineering research and who have demonstrated high potential for future leadership."

The recipient of the McGraw Research Award will be selected each year by a special committee of the Engineering College Research Council. Dean James R. Cudworth of the University of Alabama is chairman of this year's selection committee.

The first presentation of the McGraw Research Award will be at the 1957 annual meeting of the American Society for Engineering Education, at Cornell University from June 17 to 21. Nominations for 1957 should reach Dean Cudworth by February 1, 1957.

NEW PROGRAM IN PETROLEUM AREA

Petroleum Distribution, a new two-year program to equip men for work in the varied phases of the petroleum industry, has been approved at Western Michigan College, Kalamazoo, Mich., and will be inaugurated this fall.

Based upon an alternate co-operative scheme, students will be paired; while one is in the classroom the other will be gaining practical experience in some phase of petroleum distribution in a job assignment. Periodically they will exchange so that each receives needed experiences to fulfill the intent of the program.

Planned under the School of Applied Arts and Sciences, the newest educational venture on the Kalamazoo campus came about because of intense interest displayed by petroleum processors, dealers, and retailers, both within Michigan and throughout the nation.

Persons entering this two-year program will receive some technical training, science, basic studies, and their co-operative work experience. Among special courses planned for them are petroleum chemistry, introduction to petroleum industry, petroleum technology, motor-transport operation and performance, application of petroleum products, and service-station operation.

On the business sides are psychological aspects of business, economic marketing and transportation, business law, salesmanship, small-business management, credit and collection, and accounting.

Further information on this course is available upon request.

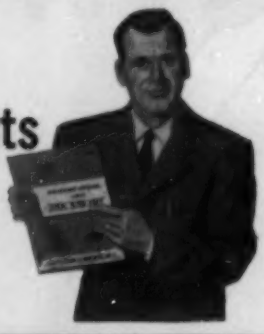
The 1956 National Directory of Safety Films is now available from the National Safety Council.

(Continued on page 32A)

Send For

"Electrical Requirements for High School Electric Shops"

(INDUSTRIAL ARTS LEVEL)



You should have Booklet No. 205 . . . *especially* if you are planning a new shop or re-vamping your present one. This booklet gives valuable suggestions; offers a shop layout plan and lists fundamental requirements.

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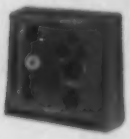

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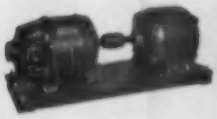
CONNECTOR CORDS

Other types furnished to meet requirements.



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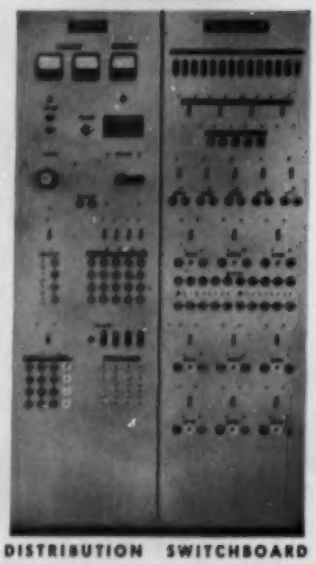
A typical machine for furnishing 125 V d-c. Furnished in any size required.



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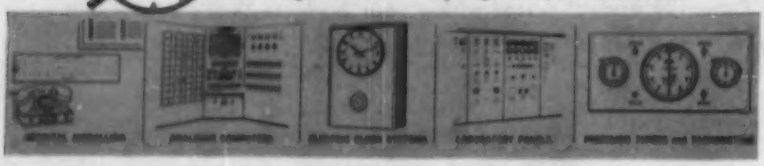

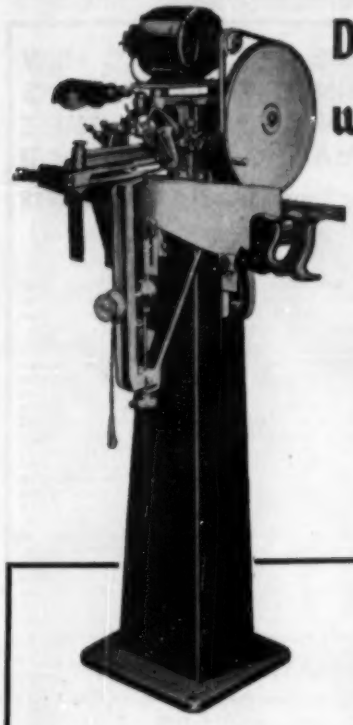

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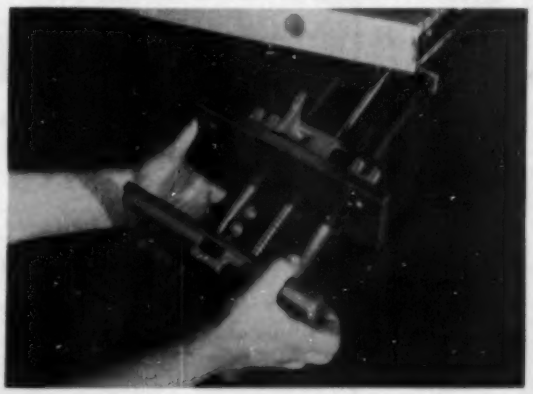

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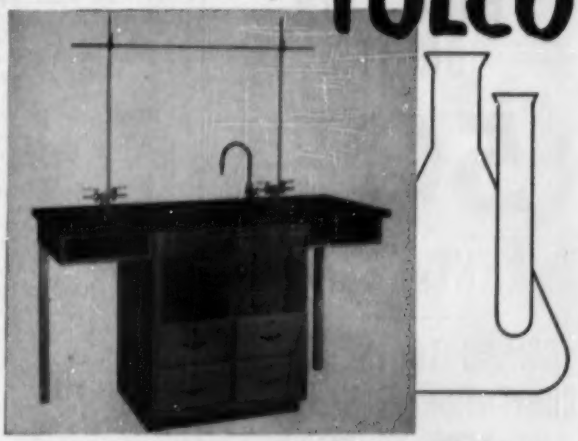

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NEWS NOTES

(Continued from page 30A)

The directory provides a compact source of information on films on safety, first aid, fire prevention, and civil defense. It describes more than 1200 films that are available without restriction on distribution. Information includes millimeter, running time, color, year of production and a brief summary of the plot.

Among the subjects covered are industrial, commercial transport, traffic, home, farm, and education. Many of the films are cleared for television and some for theatrical distribution.

Each film is available for purchase, rental, loan, or long-term lease from one or more of 292 distributors. The directory includes a separate listing for those organizations which limit distribution to specific areas in the United States and Canada. These distributors usually make films available for loan or low-cost rental and are excellent sources for public safety films.

A single copy of the National Directory of Safety Films may be purchased for $1 from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

♦ At Port Chester, N. Y., the board of education has been conducting an experiment in the use of closed-circuit television in its educational program in co-operation with General Precision Laboratory, Inc., Pleasantville, N. Y., developer and manufacturer of television equipment specifically designed for classroom use.

The aims of the program, as announced by Superintendent of Schools, Edmund M. Forsythe, are to study extending the range of the most expert teaching available to remote classes and to measure improvement in learning in classes requiring demonstration when television is used to bring to everyone in the classroom an enlarged closeup of the demonstration.

The program began on April 16 in its preliminary stages, and with the opening of the September school year, a complete classroom studio setup was installed.

♦ A special thirtieth anniversary *Directory of Private Home Study Schools* has just been released. The *Directory* lists fifty schools which meet the educational and ethical standards of the National Home Study Council, the accrediting agency for private home study schools.

"More people enrolled in home study courses last year than ever before," according to Dr. Homer Kempfer, Executive Director of the Council. "More adults enroll annually in private home study schools than enter the freshman classes of all colleges and universities in the land."

"With such large numbers enrolled, it is important that the public know where to find good courses. For thirty years the National Home Study Council has been examining home study schools and accrediting those that meet its standards. Today, of approximately 380 private home study schools in the country, only fifty meet full approval."

For a *Directory* and further information, write to the National Home Study Council, Washington 5, D. C.

♦ For better teaching, more interest, less effort, and lower cost use VEC News Filmstrips, issued weekly during the school year, vacation periods excepted.

The newest, most modern way to teach the subject that ties day-to-day events to the school's regular curriculum. Never before have educational production facilities been geared so fast. Now you have Saturday's

(Continued on page 34A)

HERE ARE SOME OF THE NEW THINGS YOUR STUDENTS CAN MAKE WITH THESE AMAZING NEW PLASTICS!

For Example...PLASTIC PLANTS

They're Easy to Make — Lots of Fun, too, with VINOFLEX

the Remarkable New Liquid Vinyl Plastic that Produces Foliage so Realistic and Life-Like, its Hard to Tell it From Live, Growing Leaves when Viewed from Just a Few Feet Away!

Now — your students can make a wide variety of authentic-looking evergreen plants for decorating windows and planter boxes with the same material used to make dolls that look and feel so real. Vinoflex, newest marvel of the plastics world, is a syrup-like liquid that pours easily and forms a tough, resilient, rubbery material when exposed to oven heat from 300 to 325 deg. F. One of the unique features is that it can be used to make *internal* or *external* reproductions of a mold. Molds can be made of metal, glass, plaster — anything that withstands 325 degrees for a few minutes. Vinoflex foliages are Fireproof, Washable, Fade-Resistant, Drooplem — can be cleansed with a damp cloth. Available in white, opaque, clear, light or dark green, red and yellow. Vinoflex comes in 8-oz., pint, quart and gallon sizes. It's ideal for making an endless variety of toys and novelties, too!

Plastic Plants (and Real Ones, too) Need a

PLASTIC GREENHOUSE!

Build Your Own with Polyethylene & Vinyl Film

We have them 0.002" and thicker. In rolls up to 6 ft. wide. Also make a perfect moisture barrier and mulch on strawberry plant beds.

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FIBERGLAS-POLYESTER AND EPOXY RESINS

Give a Lift to Any Course in Plastics!

Repair and Restyle Auto Bodies and Fenders, Build Boats, Work Bench Tops, Awnings, Furniture, etc.

Send for FREE literature giving complete buying information on *everything* you need in Fiberglas-Plastic for the school shop. It describes in detail Glass Cloth, Resins, Extenders, Catalysts, Solvents, "How-To" Books, etc. Also includes sample of this remarkable material for your inspection.

SPECIAL OFFER!

Beginner's Kit

Our "COVER-IT KIT" contains the right amount of material for the beginner student, or to experiment with yourself. Let's you see how easy it is to repair boats, toys, lamps, furniture, etc. Complete Kit.....$3.95 (plus 50c postage)

White Polyethylene Rope

If floats! Produced by the twisted-spun-laid method. It's attractive, long lasting, lightweight, dimensionally stable. Completely waterproof and buoyant. 30% lighter than natural fibre rope. Has extremely high resistance to virtually all types of acids and solvents, salt water, alcohol. It is unaffected by mold, bacteria, rot, fungi. Has excellent weathering characteristics. Does not deteriorate with age. Available in 3/16" to ¾" dia. Ideal for water ski tow lines, lane markers for swimming pools, heaving lines and other life-saving equipment, functional and decorative applications.

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America's Most Complete and Up-to-Date Line of Plastics!

It gives helpful buying data on Plexiglas, Acetate, Castolite, Molding Powders and Presses, Cold Setting and Hot Melt Castings Resins. Screw Driver Handle Stock, Finishing Compounds, and others. Don't delay — write today!

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Desk-Topper drafting machines at Northwestern State College, Natchitoches, La. Dr. Walter J. Robinson, Head of Dept. Ind. Education; Dr. Roland F. Nagel, Associate Professor. Installed by Frederick Post Co., Houston, Texas.

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Model 83 Y 265. Only **$12.65**

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"Ranger II" AC-DC Radio Knight-Kit

Popular 5-tube superhet radio project kit. Thousands now used in shop training; teaches practical radio construction. It's a commercial quality broadcast receiver when completed. Kit includes tubes, preformed chassis, speaker, loop antenna, all required parts, hardware, and easy-to-follow instructions. Shpg. wt., 8 lbs.

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100 N. Western Ave., Dept. 51-M-6, Chicago 80, Ill.

Specialists in Electronic Supply for Schools

NEWS NOTES

(Continued from page 33A)

news and the news of the week in picture form for class discussion on Monday morning, for less cost than regular filmstrips. This complete program, ready to use, contains no objectionable material, and is planned for school use only.

Visual Education Consultants, Inc., 2066 Helena St., Madison 4, Wis.

♦ A quick rundown on present peacetime uses of atomic energy is provided in a new publication by the Chamber of Commerce of the United States entitled "The Atom In Your Community."

Written in question-and-answer form the booklet gives nontechnical descriptions of uses to which the atom is being put by industry, medicine, agriculture, and as a source of power.

Copies may be ordered from the *Department of Manufacture and Industrial Development, Chamber of Commerce of the United States, Washington 6, D. C.*, at 15 cents each with reductions for bulk orders.

♦ The University of Michigan announces the schedule of conferences and institutes for teachers of vocational education and practical arts subjects to be held during the school year 1956–57.

A number of different units in the University are co-operating in the planning of these conferences. Included among them are the Extension Service; the Department of Wood Technology in the School of Natural Resources; the Departments of Engineering Drawing, Production Engineering, and Mechanical and Industrial Engineering in the College of Engineering; and the Department of Vocational Education and Practical Arts in the School of Education.

The schedule began November 3, 1956, with meetings of the Fourth Annual Institute for General Shop Teachers and the Fourth Annual Institute for Teachers of Woodwork, held jointly.

On March 16, 1957, the Fourth Annual Institute for Teachers of Auto Mechanics will be held.

The Fifth Annual Institute for Drafting Teachers and the Fifth Annual Institute for Machine Shop Teachers will be held jointly on March 30, 1957.

Concluding the schedule, the Fifth Annual Conference for Teachers of Driver Education will be held April 27, 1957.

♦ A report on *The Skilled Work Force of the United States* has been issued by the U. S. Department of Labor to help focus public attention on the need to raise the work skills of the nation.

The 32-page pamphlet, illustrated with charts in two colors, briefly describes the major skilled occupations and their place in the nation's work force, how people acquire skills, shortages of skilled workers, the relation of education to the acquisition of skill, the relation of skill to unemployment, the effects of automation on skill, the relationship between the military and civilian skills of members of the armed services reserves, and the importance of the skills to the foreign assistance programs of the United States.

The material in the report was first presented to the President and the Cabinet. It was prepared for the Department of Labor by Professor Eli Ginzberg of Columbia University, who is director of research for the National Manpower Council.

The pamphlet may be useful in classes in occupations or social sciences, or in vocational orientation programs.

Individual copies of the report may be obtained free of charge, as long as the limited supply lasts, from the U. S. Department of Labor, Washington 25, D. C.; quantity orders may be purchased from the Superintendent of Documents, Washington 25, D. C., or from any of the regional offices of the Bureau of Labor Statistics listed here:

U. S. Department of Labor, BLS Regional Office —
341 Ninth Ave., New York 1, N. Y.
105 West Adams St., Chicago 3, Ill.
630 Sansome St., San Francisco 11, Calif.
18 Oliver St., Boston 10, Mass.
50 Seventh St., N.E., Atlanta 23, Ga.

♦ Beginning with the 1956 fall term, Fisk University, Nashville, Tenn., inaugurated a closed-circuit instructional television program. Part of an extensive new academic development schedule, the teaching by television over the university's closed-circuit system is designed to improve the quality of instruction and to stimulate scholastic achievement by making its courses more widely available.

The majority of the courses to be televised will be of the large enrollment or multi-section variety such as survey courses for freshman students. TV will also be used in small-class situations having lecture demonstrations where minute or microscopic objects are to be observed.

In addition to a completely equipped TV studio, a major innovation will be extensive use of classroom program origination. The unattended classroom TV cameras were developed by and installed with the assistance of the TV equipment manufacturer, General Precision Laboratory of Pleasantville, N. Y., a company which has pioneered in this concept of educational television.

(Continued on next page)

NEW SPARTAN MODEL 24

A DI-ACRO BOX AND PAN BRAKE

with undercut box fingers and 1" material clearance

for just 295.00 delivered

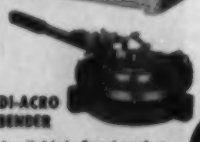
The Spartan's new design and rugged construction was planned specifically for school shops. Hardened Box Fingers are undercut to allow the forming of chassis and boxes as deep as 2½" with lipped edges as large as ½" across. Material clearance of 1" between the Box Fingers and the Bottom Plate allows for easy insertion and removal of material. The Spartan bends 16 gauge mild steel up to 135° in one operation. It can also be used as a radius former and bar folder. An adjustable back gauge and a simplified stop control are standard equipment, *available in 24" width only.*

SPARTAN MODEL DI-ACRO ROLLER

Built exclusively for school shops in five widths, 12" to 36", all with 2" machined rolls. Form smooth cylinders with radii of 1" and larger in sheet metals up to 16 gauge. Heavy welded steel and cast construction. Delivered for as low as $105.00.

DI-ACRO SHEAR

An industrial tool available to schools in 6", 9", 12" and 24" widths. Capacity 16 gauge steel.



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Available in five sizes that form bar stock, flats and tubing in a minimum of change-over time.

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NEWS NOTES

(Continued from previous page)

♦ Students from seven foreign countries and two United States possessions are included in the record enrollment of 1152 at Stout State College, Menomonie, Wis. This total is nearly 100 more than last year's previous record high.

Of the 1152 total, 661 are men in industrial education or in Stout's new industrial technology curriculum. The remainder are women majoring in various phases of home economics.

First year students total 387, sophomores 302, juniors 235, seniors 196, and graduate students 23. Among nine special students are those from Malaya, Iraq, Thailand, Costa Rica, Canada, Jordan, Paraguay, the Phillippines, and Hawaii.

♦ The Cooper Union for the Advancement of Science and Art, New York, N. Y., conducted a program on October 6, and a convocation on October 8 and 9 to plan for their centennial program. This was attended by a thousand alumni of the Cooper Union, and by national leaders to discuss new ways of solving the shortage of technologically trained manpower in America.

The celebration of the one hundredth anniversary of the tuition-free institution will take place in 1959.

The centennial program is under the sponsorship of an honorary committee headed by former President Herbert Hoover.

Serving under Mr. Hoover, as honorary vice-chairmen of the Centennial Committee are Bernard M. Baruch, Dr. Ralph J. Bunche, Henry F. du Pont, James A. Farley, Edward Ringwood Hewitt (grandson of Peter Cooper, founder of the Cooper Union), Senator Herbert H. Lehman, Alfred P. Sloan, Jr., Charles E. Wilson, and Owen D. Young. Approximately 200 prominent Americans have accepted invitations to serve as members of the Centennial Committee.

♦ Wayne State University at Detroit, Mich., is going to open four new industrial-arts shops next year. They are: woodworking shop, metalworking shop, drafting shop, and power-mechanics shop.

New Publications

Safety Education

By A. E. Florio and G. T. Stafford. Cloth, 327 pp., 6¼ by 9½ in., $5.50. McGraw-Hill Book Co., New York, N. Y.

A very fine text on the important subject of safety.

Part one of the book discusses the need for safety instruction, explains the psychological considerations, shows how to plan the school safety program, and discusses the teaching methods to be used.

It also treats of how to provide a safe school environment, and explains the liability for school accidents.

The various areas of safety considered are pedestrian safety, bicycle safety, driver education, home safety, farm safety, fire safety, vocational safety, and safety in physical education.

The book also contains a list of visual aids to be used in teaching safety.

Metallurgy

By Carl G. Johnson and William R. Weeks. Cloth, 454 pp., 5¾ by 8½ in., illus., $5.50. American Technical Society, Chicago, Ill.

This practical survey work is concerned primarily with physical metallurgy — dealing with the physical and chemical behavior of metals during shaping and treating operations, and their behavior in the service of man. The selection and application of metals in modern industry is discussed at length throughout the book.

Technical and vocational schools with programs in metallurgy and related fields will find *Metallurgy* hand-tailored to meet their requirements as a basic text. The carefully worked-out Quiz Questions at the end of each chapter will be useful both in the classroom and for home-study purposes.

The fourth edition included an entire new chapter on the recently developed metals Titanium, Zirconium, Indium, and Vanadium. Methods of production, physical and mechanical properties, and uses of these important new additions to the family of engineering metals have been treated with unusual clarity and thoroughness. The addition of this valuable material has been instrumental in creating a work which we believe to be unsurpassed in its field.

Automotive Brakes and Power Transmission Systems

Edited by Irving Frazee and Earl L. Bedell. Cloth, 266 pp., 5 13/16 by 8½ in., illus., $6.95. American Technical Society, Chicago, Ill.

This book is the product of skilled mechanics, and the editing was done by men who know both the technical side of the subject as well as how to teach it to the young.

The subject matter of the book is divided into 7 chapters, which describe the how and why of brakes, power transmissions, clutches, fluid couplings, torque converters, transmissions, auxiliary, universal joints, and driving axles.

(Continued on next page)

KEEP PACE WITH INDUSTRY... offer training in plastics this low cost way

NEW, DI-ACRO PLASTICS PRESS FOR SCHOOL SHOPS—ONLY $595.00

This unusual Di-Acro plastics press enables school shops to take plastics out of the purely handicraft stage and to duplicate many creations of the modern plastics industry. The machine will perform all basic operations of the plastics forming industry—mechanical stretch forming, vacuum forming and blow forming.

A unique machine in any school shop, the Di-Acro Press fits well into conventional areas of industrial education. Students can get industrial-type experience from simple machine operation to the most advanced type of three dimensional plastics projects from student-made molds and plugs.

LOW-COST MATERIALS

Forming with the Di-Acro Plastics Press No. 18 makes use of one of the lowest cost materials on the market—the styrenes, in addition to acrylics and vinyls. A variety of colors are available in 18" x 24" sheets of both acrylic and styrene plastics in many thicknesses.

Write for free 14 minute demonstration film "FORMING PLASTIC SHEET MATERIALS" from O'Neil-Irwin Mfg. Co.

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PLEASE SEND:
- Plastics Press Instruction Manual
- Plastics Price Sheets
- Plastics for the School Shop

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351 Eighth Avenue • Lake City, Minnesota

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School_____

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NEW PUBLICATIONS

(Continued from previous page)

Handbook of Basic Circuits

By Matthew Mandl. Cloth, 365 pp., 6¼ by 9½ in., illus., $7.50. The Macmillan Co., New York, N. Y.

This text covers in a single book the many circuits met with in TV, radio, audio, and electronics. It is a carefully organized reference text that permits of quickly and conveniently locating the subject looked for.

It presents 136 representative circuits in the reception and transmission of television, and frequency and amplitude modulation. The basic circuits described are also applicable to high-fidelity, and public-address systems, as well as to industrial and commercial electronics.

The appendix contains additional material on classification and characteristics of amplifiers; VHF and UHF television station frequencies; black-and-white, and color transmission standards, terms, and definitions; block diagrams of various types; and *VHF-UHF* transmission-line sections as filters.

Automotive Electrical Systems

Edited by Irving Frazee and Earl L. Bedell. Cloth, 436 pp., 5 13/16 by 8½ in., illus., $6.25. American Technical Society, Chicago, Ill.

This book aims to give a knowledge of the basic electrical principles underlying the theory embodied in the automotive electrical circuits, systems, and equipment found in any automobile.

B-G Presents the New Grip Guard
PROVIDES SAFETY IN EVERY SHOP
A safety woodworking tool saves capable hands from needless harm.
GRIP-GUARD is an entirely new safety tool made to protect hands while working with powered saws and jointers. It eliminates serious wood-working accidents in school ... in addition it facilitates the positioning and guiding of wood on high speed machines.
GRIP-GUARD is an aluminum casting ¾" wide, 16" long and 5" high, weighing 1 1/2 lbs. Its specially shaped, non-slip handle accommodates either one or both hands.
Seated and held by Phillips Head screws in the solid aluminum base are 5 dual-pronged clips of hardened steel. These clips are reversible for double use and adjustable to varying depths of penetration. Clip points leave no noticeable marks in even the hardest materials.
GRIP-GUARD is placed squarely on the material to be cut, and pressed downward until clip points are set. Material is thus held tightly and fed past the sharp rotating teeth or blades. In use, operator's hands are completely above and away from danger while accurate control of material is maintained.
$8.95
(Clips replaceable at 5¢ each)
Full instructions supplied with each unit.
Send for new B-G Catalog
BRODHEAD-GARRETT CO.
4560 East 71 St., Cleveland 5, Ohio
50 Years Serving School Shops in America

For this purpose the book first explains what the student should know about electricity and magnetism. Then storage batteries, generators, and generator cutouts are studied, after which generating systems, horns, and sirens, and instruments and gauges are thoroughly explained and discussed.

Industrial Arts Arc Welding

By William A. Sellon. Paper, 56 pp., 5 7/16 by 8½ in., illus., 25 cents. The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

A handy brochure which describes the place of arc welding in industrial arts, the types of school shops in which arc welding can be utilized, the preparation a teacher should have to teach the subject, the equipment and supplies that are required, how to teach arc welding, how to install and maintain the arc welding equipment, safety precautions, projects that can be made for the home and school, and instructional aids and material for the welding class.

Modern Techniques of Excavation

By Herbert L. Nichols, Jr. Cloth, 608 pp., 6⅝ by 9½ in., illus., $9. North Castle Books, Greenwich, Conn.

This book gives a comprehensive picture of what it means to do land clearing by means of hand or machine labor. It also explains how levels are established. Soil, mud, and stuck machinery are handled. Chapter four is on cellars, five explains ditching and dewatering. Chapter six is on ponds, seven explains about landscaping and agricultural grading, eight is on road building. Other chapters take up rock blasting and tunneling, and pit operation. Chapter eleven is on costs, ownership, operating costs, and estimating.

The book also contains a chapter containing hints on maintenance.

Atomic Energy

By A. Radcliffe and E. C. Roberson; illustrated by F. H. Holderness. Cloth, 142 pp., 5 by 7½ in., illus., $4.75. The Philosophical Library, New York, N. Y.

A small but extremely interesting book which explains why atoms that were looked upon as indestructible, can now be exploded and thus caused to give off their energy so that they can be used in bombs and in the form of heat and power that can be utilized for commercial and industrial purposes.

The chapters explain what atoms are really like, what makes some atoms explode, shooting at atoms, building atoms, bombs, controlled fission, *piles*, uses of atomic by-products, and atomic power in the future.

Transistor Circuit Handbook

By Louis E. Garner, Jr. Cloth, 410 pp., 5 13/16 by 8¼ in., illus., $4.95. Coyne Electrical School, Chicago, Ill.

A valuable handbook for those working with transistors. The book is a practical reference book covering 200 basic circuits.

Transistors have practically replaced vacuum tubes, and new applications of these mighty mites are being discovered from day to day.

The book is divided into four parts. The first of these is devoted to laboratory practice. Basic circuits are presented in Part II. Part III treats on circuit applications, and Part IV contains reference data, definitions and design formula, special techniques, new developments, and a comprehensive bibliography.

Railways the World Over

By G. Freeman Allen. Cloth, 128 pages. Price, $10. Philosophical Library, Inc., New York, N. Y.

This beautifully illustrated book has caught

(Continued on page 38A)

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C-7702 ART TABLE

Before You Decide Ask Mayline For Prices.

Before you buy, write Mayline for literature, prices and delivery on products you may require for your drafting room or art classes.

Our fine furniture is made from kiln dried hardwoods; it is well constructed, and it is attractively finished. You will be pleased, in particular, with our low prices.

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No. 120 furnace heats up to 1500° in 5 minutes—saves time in the shop

No long waiting for warm up when you instruct heat treating with a powerful Johnson No. 120 Hi-Speed Furnace. Heats 2300° in 30 minutes, temperature easily adjusted for carbon and high speed steels, tools, dies, and small metal parts. Economical operation with natural, mixed, artificial or bottled gas. Complete with Carbofrax hearth, G.E. Motor and Johnson Blower. Firebox 5" by 7¼" by 13½". 120,000 BTU's per hr. maximum. $167.00 ....F.O.B. Factory.

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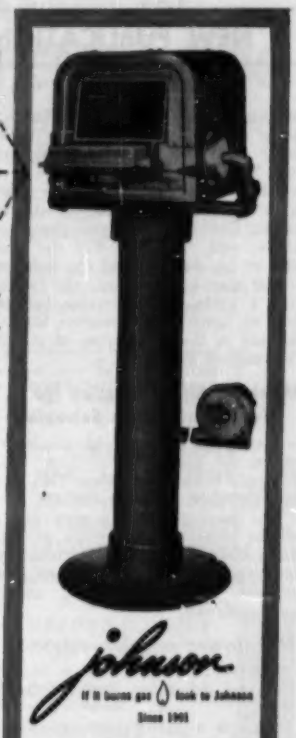

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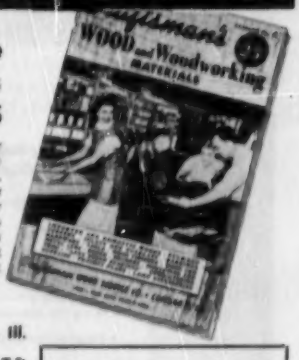
Sterling Steel Flasks are ideal for stack molding because they are built to withstand terrific pressures. A reinforcing rib around the side prevents distortion and misalignment of stacked molds. Top and bottom have solid sand flanges. Full width bearing.

Write for new catalog describing the complete Sterling line.

STERLING WHEELBARROW CO. Milwaukee 14, Wis., U. S. A.

Sterling FOUNDRY FLASKS

ALL NEW, COMPLETE CATALOG OF WOOD & WOODWORKING EQUIPMENT FREE TO INSTRUCTORS



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- Embossed mouldings, carved ornaments, matched plywoods and veneers
- New! Complete lines of upholstering and archery supplies
- Same day shipment guaranteed

NEW PUBLICATIONS

(Continued from page 36A)

the romance of railroads and railroading and makes available a vast amount of information about railroads, their equipment and operation. While the earlier chapters give the impression that the book is purely British, ample space is devoted to engines and trains in the leading European countries, the United States, Africa, and Australia. For the older reader, who in his day enjoyed the noise and smoke of the steam locomotive, the book will provide a nostalgic satisfaction because a great deal of space and numerous illustrations are devoted to the older types of steam giants of the railroad world.

Machine Shop Practice for Vocational High Schools

A syllabus published by the Board of Education of the City of New York. Paper, 173 pp., 6 by 9 in., illus. This is curriculum bulletin 1954–55 Series No. 10.

The book presents a very fine description of the objectives and goals of machine shop work, explains the supplementary teaching units, gives the course contents, teaching procedures, shop management and biography, and materials.

Manpower and Education

Paper, 128 pp., 6 by 9 in., illus., $1.25. National Education Association, Washington, D. C.

This is a report prepared by the Educational Policies Commission, a commission of the National Education Association and the American Association of School Administrators.

The nine chapters of the brochure present America's man-power problem, areas of man-power shortage, under-used potentials, man-power policy and democratic values, education and career, guidance and personnel services, educating the gifted, obtaining enough qualified teachers, and recommendations.

The booklet contains 5 tables showing the increase of population, years of schooling completed, professional workers needed, women in specialized fields, and levels of schooling.

The nine charts shown depict the groups in the population, college graduates, major occupations, women at work, major economic groupings, major occupations of minorities, elementary school enrollment, secondary school enrollment, and college enrollment.

Course Offerings in Guidance and Student Personnel Work

Compiled by Paul MacMinn. Paper, 102 pp., 8 by 10½ in., 55 cents. U. S. Department of Health, Education, and Welfare, Office of Education, Washington, D. C.

This is a directory of colleges and universities offering courses for the preparation of those who are preparing to enter guidance and student personnel fields.

Design in Civil Architecture

Vol. I. Elevational Treatments. By Sir Albert Richardson and Hector O. Corfiato. Cloth, quarto, 216 pp., $15. Philosophical Library, New York 16, N. Y.

This book is a collection of pen and ink drawings, illustrating the front elevations of civic buildings in the European countries and in North and South America. The book provides for architectural students a review of the outstanding examples of buildings which have been designed to reflect the dignity of the governments and economic and social position of important citizens of the Renaissance and later periods. Buildings of Italian and French influence predominate, even among the significant American examples. Perhaps it is inevitable that contemporary architecture is somewhat inadequately treated. The book will make a valuable reference in school libraries where architectural design is studied.

Spectroscopy at Radio and Microwave Frequencies

By D. J. E. Ingram. Cloth, 332 pp., 5½ by 8½ in., illus., $15. Philosophical Library, New York, N. Y.

With the increased number of applications of microwave and radio frequency spectroscopy in many fields of science, there is need for a greater knowledge of how to apply the techniques in other fields of application.

This book describes the nature of gaseous and solid state spectroscopy; the production and detection of microwaves; waveguide techniques; microwave spectroscopes; results and theory of gaseous spectroscopy, and of paramagnetic resonance; ferromagnetic resonance, free radicals, and *F*-centers; radio frequency spectroscopy; applications of radio frequency and microwave spectroscopy; and the application of spectroscopy at radio and microwave frequencies to practical problems.

Copious references are given throughout the book, and there also is an appendix giving resonance equations and definitions.

Dictionary of Poisons

By Ibert Mellan and Eleanor Mellan. Cloth, 150 pp., 5½ by 8½ in. Philosophical Library, New York, N. Y.

Nowadays there is much danger of children and even adults being poisoned by many of the materials used in the home and in the workshops and factories.

This book contains the names of a large number of such poisonous substances and gives directions on how to use antidotes and other means to remove the poison and save the patient.

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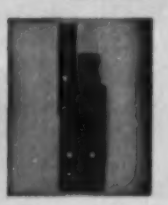

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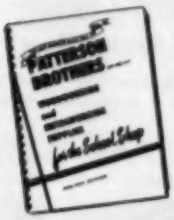

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Shop Equipment News

WILTON WOODWORKER'S VISES

Wilton Manufacturing Company have redesigned the Wilton Woodworker's Vise, so that it can be completely mounted and perfectly aligned in a few minutes. They made four major design changes to provide this speed and accuracy of mounting. They replaced conventional mounting holes with slots, so that the vise can be easily positioned and perfectly aligned *after* lag screws have been started. The slots were moved forward to the vise's point of balance, and elongated *feet* were added to the casting, so that the

Wilton Woodworker's Vise

vise balances itself when it is pushed over the lag screws.

The other two changes were made to assure an airtight fit between the back jaw of the vise and the bench top. The curve of the casting was relieved at the point where it meets the bottom edge of the bench; and the angle between the back jaw and the bench was reduced from 90 to 89 deg.

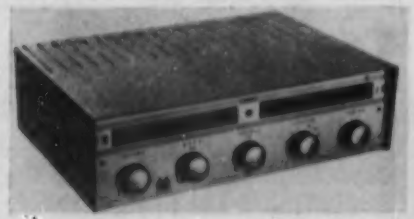
A template is furnished with each vise, for use in locating and starting lag screws before the vise is lifted into position.

For additional information on the other features of this easy mounting design write to the manufacturer.

(For Convenience Circle Index Code 1001)

KNIGHT UNI-FI TUNER-AMPLIFIER

Allied Radio Corporation is now offering a low-cost tuner-amplifier combination to meet the needs of the hi-fi fan with a limited budget, and it is excellent for homes where space is limited. Named the Uni-Fi, it features unified design to achieve excellent hi-fi performance at a low price. It has a full set of controls and combines FM-AM tuner, magnetic preamp and 10-watt hi-fi amplifier on a single chassis for greater hi-fi value and top convenience.



The Knight Uni-Fi Tuner-Amplifier

It is housed in a cork-grained metal cabinet, with brushed brass panel, and trimmed down to a height of 4⅛ in. It is also available less cabinet.

(For Convenience Circle Index Code 1002)

FRACTIONAL HORSEPOWER DYNAMOMETER

The Standard Electric Time Company announces their new Dynamometer, Model 1100, designed to aid in analyzing and demonstrating the operation of fractional horsepower motors, generators, and dynamometers. It also permits the testing of internal combustion engines and other mechanical equipment of similar rating.

Fractional Horsepower Dynamometer Model 1100

This equipment will be valuable to technical and vocational schools and college engineering departments for:

1. Demonstrating motor and generator characteristics.
2. Checking performance of units built by students.
3. Demonstrating principle and uses of dynamometers.
4. Determining starting and maximum running torques.

Model 1100 is a d.c. unit, separately excited, suitable for operation from a 125-volt power source.

Included as part of the control panel are an armature ammeter, armature voltmeter, "low-off-high" load switch and a field rheostat. Two screw-base type resistor units (660 watts each) are located on the subbase for loading the dynamometer as a generator. Larger resistor units can be used.

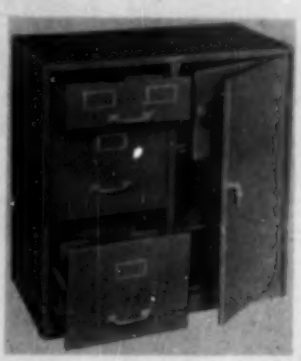
Literature showing speed vs. torque curves and complete specifications are available from all offices of The Standard Electric Time Company.

(For Convenience Circle Index Code 1003)

NEW COMBINATION CABINET WITH A HIDDEN VAULT

Precision Equipment Company announces production of an all-in-one combination cabinet which has been designed to serve a great variety of filing and storage functions.

This cabinet features a hidden vault with a combination lock to protect valuables and to keep private papers really private. The vault is doubly protected by a combination lock and by the outside door with its built-in flat-key lock. Two letter-size file drawers each



Cabinet with Hidden Vault

glide noiselessly on ball-bearing rollers and are fitted with spring compressor follower blocks.

A card drawer can be used for canceled checks or by 4 by 6 or 3 by 5 cards (3200 capacity). The convenient storage compartment, 16¾ by 15 in. w. by 16 in. d. has an adjustable shelf and built-in lock with two keys.

The over-all size of the entire combination cabinet is 32½ h., by 30½ w., by 17 in. d. It is built of heavy-gauge furniture steel and finished in a beautiful silver-gray baked enamel.

Further information is available upon request.

(For Convenience Circle Index Code 1004)

NEW PECK & HARVEY "SPEEDMASTER 4000C"

A new, high-power, high-speed, 4000 watt, 40 ft. per minute, 44-in. width capacity, 230-volt whiteprinter, the compact Speedmaster Model 4000C, has been announced by Peck & Harvey Manufacturing Corporation.

New Peck & Harvey SpeedMaster Model 4000C

The P & H SpeedMaster Ammonia-Drv Whiteprinters handles cut sheets or roll stock at a synchronized printing and developing speed up to 40 ft. per minute. The new SpeedMaster 4000C is designed to provide the efficiency of volume production whiteprinting from translucent originals and still meet today's requirements of minimum space and low initial cost.

This machine is so easy to run that no

previous experience is required. It utilizes the dry ammonia vapor process of true-to-scale diazo reproduction. The P & H electronic drive provides quiet, instantaneous speed control, with full stop and reversal switch for emergency return of originals. The speed control also automatically varies the developing temperature to assure full, nonfade development at all speeds, with consequent low-volume use of ammonia.

Cut sheets and roll stock have separate storage compartments. Roll stock is used directly from storage area without rehanging under feedboard. A spring-type wire paper cutter is provided. A second hanger in storage area accommodates extra roll.

The SpeedMaster 4000C is 60 by 20 by 62 in. high plus a 14-in. feedboard. Uses 8 sq. ft. of floor space. Operates on 230-volt, 60-cycle a.c. Starts at 25 amps.; operates at 28 amps. Net weight 700 lb.

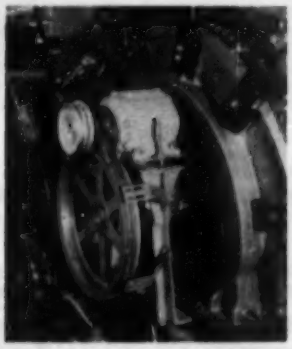
For complete details write for Bulletin 56S1.

(For Convenience Circle Index Code 1005)

FLEXIDYNE CARD DRIVE

Dodge Manufacturing Corporation announces a new and improved card drive, designed to solve the textile mill operator's problem of giving a soft start to the heavy inertia card mechanism.

The new drive is built around Flexidyne, the dry fluid drive, which was announced by Dodge last year.



Flexidyne Card Drive

Flexidyne Card Drive makes it possible to give a smooth start to a card which has a heavy inertia load, and to accelerate the card to full running speed within 30 seconds without excessive strain on either the motor or card.

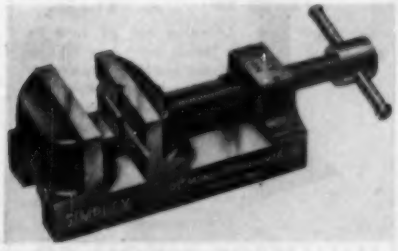
Detailed information on its numerous good features is available.

(For Convenience Circle Index Code 1006)

NO. 3-DP DRILL PRESS VISE

The Desmond-Stephan Mfg. Co., have added to their line the No. 3-DP drill press vise, designed for light duty use. It has a full 3-in. jaw width and a full 3-in. jaw opening, with a jaw depth of 1½ in., and weight of

(Continued on next page)



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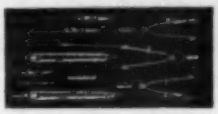

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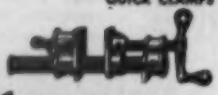

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SHOP EQUIPMENT NEWS

(Continued from previous page)

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More complete information is available upon request.

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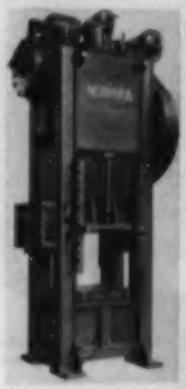
Niagara Single Crank Straight Side Press

NIAGARA SINGLE CRANK STRAIGHT SIDE PRESS

A new line of Single Crank Straight Side Presses is now being built by Niagara Machine & Tool Works.

Companion to the famed Niagara Double Crank Straight Side Presses, this new line features fully streamlined, enclosed construction, front and back, concealing the driving mechanism.

For more complete information on this product write to the company.

(For Convenience Circle Index Code 1008)

LOGAN LATHE CABINETS

The change-over in the styling of Logan Lathe cabinets and pedestal bases has been announced by Logan Engineering Company. The resulting "new look" in Logan 12-in., 11-in., and 10-in. swing cabinet and pedestal base lathes makes these models similar in appearance to the 14-in. swing Logan Lathe, pace-setter of the line.

Logan 12-in. Swing Lathe mounted on new style cabinet base

Two styles of cabinets are available for the 12-in., 11-in., and 10-in. Logans. In one style a single door opens to reveal three spacious storage compartments or shelves inside the right pedestal. The second style provides three separate pull-out drawers with individual locks. Both these pedestal base cabinet styles feature a wide, deep, and capacious chip pan.

Further information is available upon request.

(For Convenience Circle Index Code 1009)

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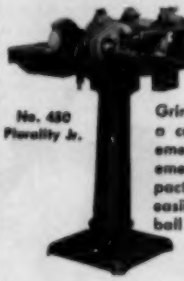
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(For Convenience Circle Index Code 1010)

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Boice-Crane 3100 Series Spindle Shaper

machines to job site or within the plant to effect material handling economics. This new power tool is not only very portable but can be used anywhere without anchoring.

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(For Convenience Circle Index Code 1011)

NEW FOG-PROOF PLASTIC EYESHIELD

An innovation in protective flexible plastic eyeshields is a new fog-proof design by the United States Safety Service Company. This new product is unlike ordinary goggles. The *Airflow* features a noncorrosive nickeled 20-mesh ventilating screen that is over 10 in. long. The *Airflow* has a bigger ventilating area than the area around spectacles without sideshields.

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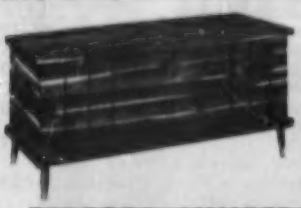

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SHOP EQUIPMENT NEWS

(Continued from previous page)

uct to be introduced by USSSCO. Full vision sideways and downward is an additional feature built into the *Airflow* type frame. The pantoscopic angle (lens tilting in toward the face as in personal glasses), permits greater work area vision without moving the head forward.

For workers who wear prescription glasses, even with widest frames, the *Airflow* type frame is unusually comfortable since temple pressure is eliminated. No transmission of impacts is possible because of an additional ½-in. space between lens of *Airflow* and spectacle lenses. Optical plastic lenses, highly resistant to pitting, are replaceable without tools. The entire unit weighs less than 2 ounces.

(For Convenience Circle Index Code 1012)

AMERICAN TYPE FOUNDERS OFFERS SCHOOLS OFFSET DEPARTMENT FLOOR PLANS

The remarkable growth of lithographic printing, with its many vocational opportunities, has prompted many schools to install offset equipment to supplement the usual letterpress training offered in graphic arts courses.

American Type Founders, in response to the demand for guidance in the proper layout of an offset department, has published a folder showing three efficient floor plans utilizing various types and sizes of equipment. All three plans are designed primarily for the school or shop wishing to add offset equipment to an existing letterpress department; however, all three are also basically sound for an independent offset department — requiring only the addition of a paper cutter and small auxiliary equipment.

Two of the three plans include complete camera and platemaking equipment; the third eliminates the camera and developing units, but provides for platemaking. All three layouts are designed around equipment for use with presensitized plates only.

Copies of this new six-page "Planning Your Offset Department" folder may be obtained without charge from any ATF Sales Representative, or by writing to American Type Founders.

(For Convenience Circle Index Code 1013)

THE NEW "CRAFTOOL DUSTMAN"

Craftools, Inc., announces the New Craftool Dustman, a portable dust collecting and shop cleaning unit designed for the small industrial and school woodworking shop.

The Dustman collects sawdust and dust right at the machine, thereby eliminating the floating dust problem in the shop. The Dustman is also used for cleaning the machines, woodworking or metal, for cleaning displays, and for general cleaning in the shop and work areas.

It draws in the sawdust or dirt through the standard hood and 2¼-in. diameter hose. The suction is created by a powerful, specially designed 8-in. pressure type blower, the same type unit that is used in industrial plants for conveying material.

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Business and Personal News

BENNETT COMPANY APPOINTS CARL STRACENER

The Chas. A. Bennett Company, book publishers of Peoria, Ill., announced the promotion of Carl Stracener to special representative for the North Central, North Carolina, Virginia, and California areas.

Before joining the Bennett Company in June, 1956, Mr. Stracener taught industrial arts at Cypress, Tex., High School, and the junior high school at Spring Branch, Tex. He attended the University of Houston, Houston, Tex., where he received both his bachelor of science and master of education degrees.

As a special representative for the Chas. A. Bennett Co., he will work from the home office in Peoria, Ill.

NEW DISTRICT MANAGER

The Black & Decker Manufacturing Company has appointed Robert E. Stone, Jr., as Los Angeles Industrial-Automotive Division District Manager. Mr. Stone's position was created recently as a result of divisionalization of sales forces in the portable electric tool company.

CADILLAC PLASTIC OPENS BRANCH UNITS

Opening of branch units in Milwaukee, at 517 N. Broadway, and in Cleveland at 3333 Detroit Ave., marked another step in the expansion program of Cadillac Plastic and Chemical Company, Detroit, Mich.

Raymond Weber has been appointed manager of the Cleveland branch, and George Gray was appointed to manage in Milwaukee.

Cadillac Plastic, founded in 1946, is now the nation's largest warehouse distributor of thermoplastic sheets, rods and tubes, serving more than 20,000 active accounts. Other warehouse-sales office units are located in Detroit, Chicago, St. Louis, Los Angeles, and San Francisco, giving the company a total of seven.

DeWALT INC., MAKES APPOINTMENTS

Charles W. Snyder, formerly Philadelphia district sales manager, has been named to fill the newly created post of industrial sales specialist for DeWalt Inc.

Howard L. Hershock, formerly a salesman-demonstrator, has been named to succeed Mr. Snyder in the Philadelphia sales district.

Mr. Snyder was appointed to the Philadelphia post in October, 1953, after almost 15 years previous service with the company, serving successively as service representative, field service engineer, and manager of the firm's development, sales, and installations of metal-cutting machinery.

Mr. Hershock joined DeWalt Inc., in June, 1955, as a salesman-demonstrator, in which capacity he has served until the present time with the primary function of assisting the company's district managers throughout the nation on special promotion, new store openings, and similar public events.

SCHOOL COUNSELING SERVICE

Crow Electri-Craft Corporation of Vincennes, Ind., have made available expert counseling on how to set up electrical or electronic shop instruction in any size school.

(Continued on next page)

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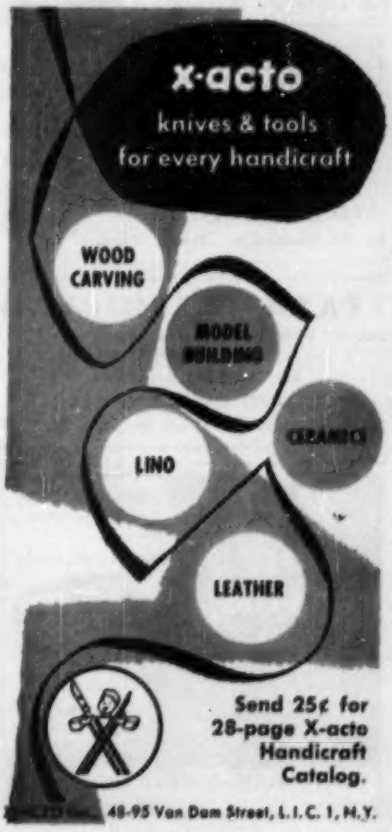

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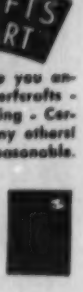

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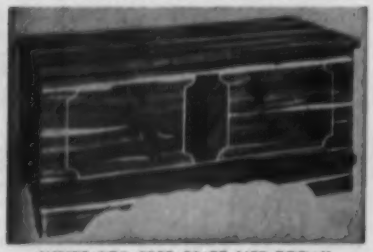

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BUSINESS AND PERSONAL NEWS

(Continued from previous page)

The School Counseling Service is considered a public service adjunct of Crow Electri-Craft's "learn-by-doing" electrical and electronic instruction kits, widely used in secondary schools for the past two decades.

Educators are invited to submit any and all problems pertaining to electronic instruction, whether for a new school plant or for remodeled or expanded shop facilities.

The Crow School Counseling Service will supply detailed recommendations for the complete shop, including wiring, conduits, power supplies, workbenches, meters, instruction equipment, manuals and course outlines.

Further information may be obtained by writing to the company.

BLACK & DECKER OPENS IN BELGIUM

A new warehousing, service, and sales subsidiary in Brussels, Belgium, was opened recently by The Black & Decker Manufacturing Company, Towson, Md. The new company, called Black & Decker (Belgium) S.A., will distribute the complete line of Black & Decker portable electric tools throughout the Belgium-Luxembourg area, according to Robert D. Black, president and chairman of the board.

This is the seventh foreign subsidiary to be established by the company, including the British and Australian companies, Canada, Union of South Africa, Mexico, and Brazil.

Operations in the Belgian subsidiary will be under the direction of John Meredith, export sales manager of the British subsidiary in Harmondsworth. Manager of the new company is M. F. G. Wright, also of Hardmondsworth.

MR. PARSON RECEIVES APPOINTMENT

Don H. Parson, well known in the audio-visual industry as Director of Distribution, Moody Institute of Science, Santa Monica, Calif., has joined the Society for Visual Education, Inc., Chicago, as West Coast Manager. Mr. Parson will devote his full time to assisting dealers in the sale and promotion of S.V.E., products.

Prior to his association with Moody Institute of Science, Mr. Parson was assistant to the president of Club Aluminum Products.

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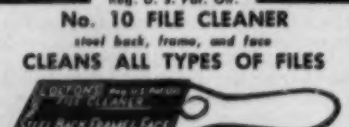

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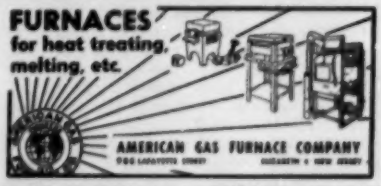

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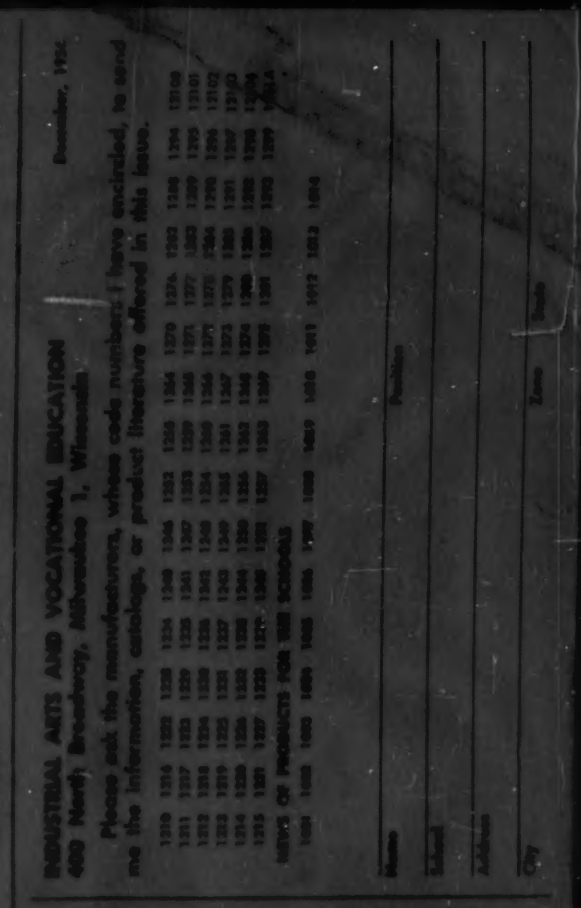
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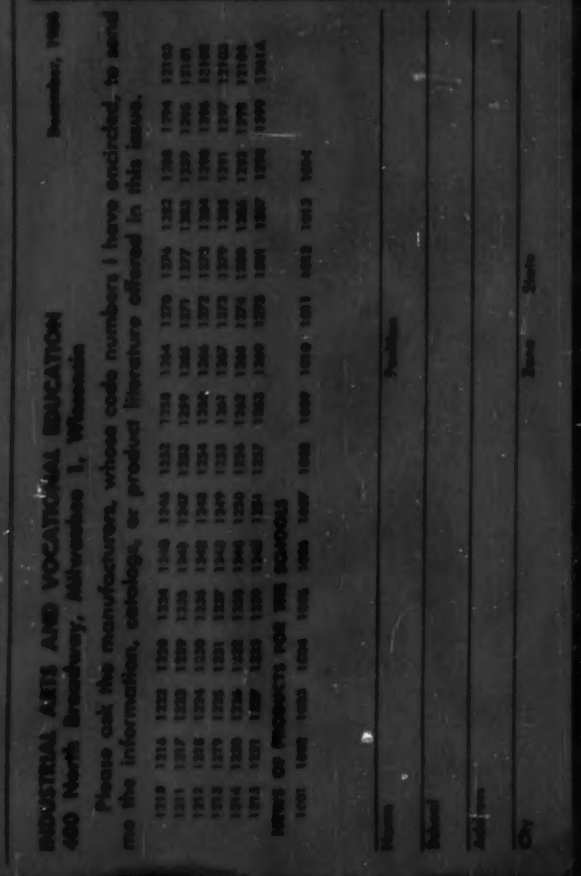
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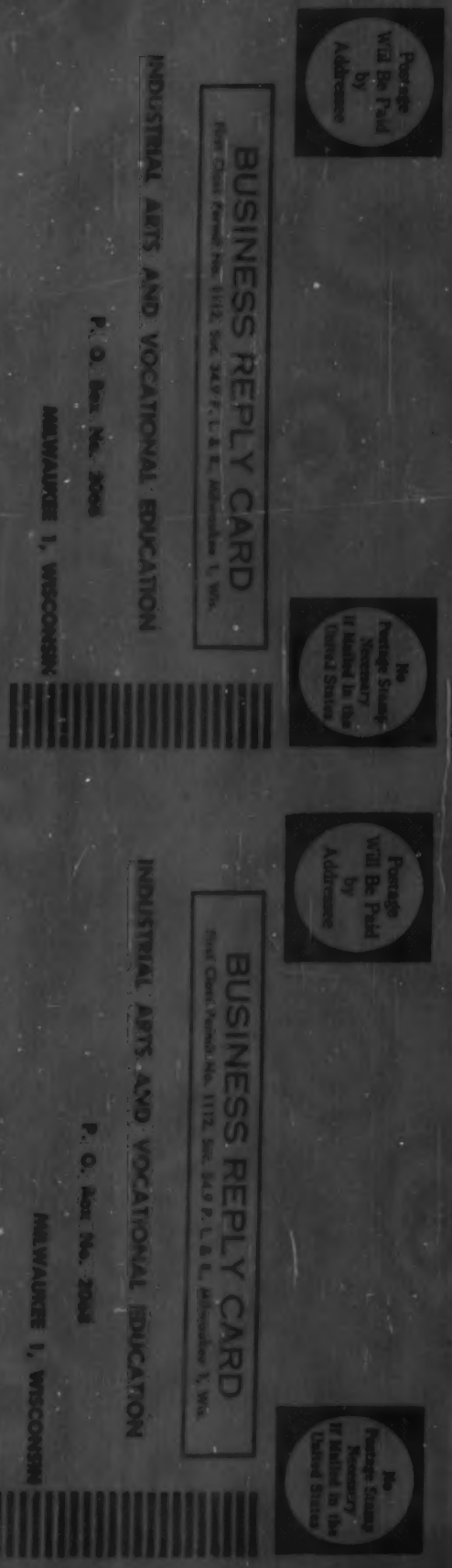
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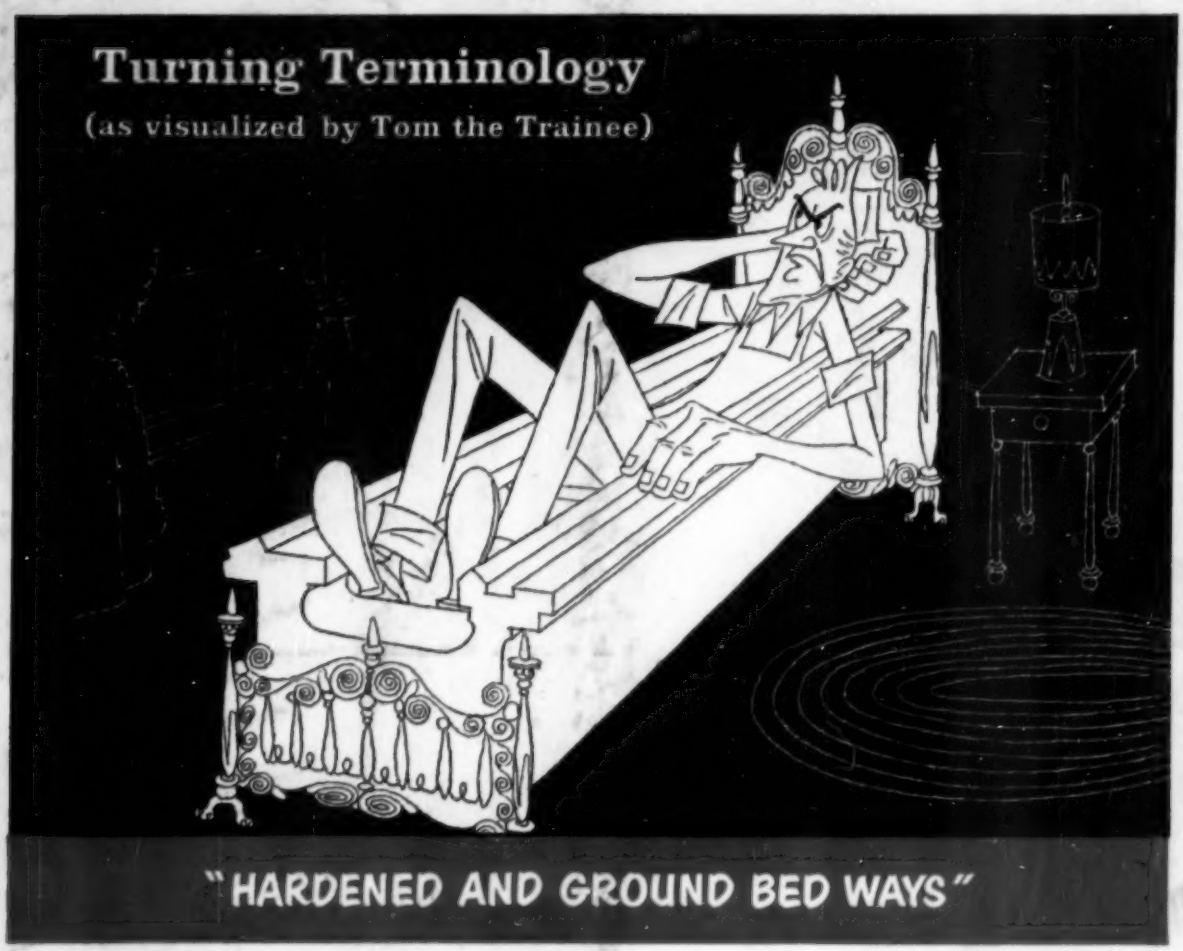

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